

Panasonic

Technical Guide

GPH10D Chassis, 10Th Generation Monitor, PR and PH Series

Applies to models:

TH-37PR10U
TH-37PH10U
TH-42PR10U
TH-42PH10U
TH-50PH10U
TH-58PH10U



Model TH-42PR10

Panasonic Service and Technology Company
National Training

Panasonic ideas for life



10th Generation High Definition Plasma Display Monitor

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Warning

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Table of Contents

Subject	Page #	Subject	Page #
Title Page	1	Shutdown Circuits	30
Warning Page	2	SOS Detection Timing Table	31
Table of Contents	3	SOS Detect Circuit (D Board)	32
Topics	5	15V, 3.3V, and 5V SOS Detect Circuit (D Board)	33
Flexibility & Expandability	6	Circuit Board Associated with 2 Blinks	35
Board Layout	8	Circuit Board Associated with 5 Blinks and VDA Distribution	36
TH-42PR10UK Board Layout	9	Drive Reset	39
TH-42PR10UK Board Layout	10	Bypass Drive Reset	42
TH-42PR10UK Board Description	11	Scan/Sustain SOS Detect Circuits	43
TH-42PH10UK Board Layout	12	How to Isolate the Scan Drive Section	45
TH-42PH10UK Board Description	13	How to Isolate the SU and SD Boards	46
Overall Block Diagram	14	Symptoms of defective SD boards	47
Power Supply	16	Symptom of Defective SU Board	48
Power On Operation	17	How to Isolate the SS board	49
Voltage Distribution When the Unit is On	19	15V, 3.3V, and 5V SOS Detect Circuit (DN Board)	51
Standby Power	20	10 Blinks SOS (SLOT PCB SOS) (DN Board)	53
DN6/D5 Disconnected	22	Signal Process	55
Panel Drive Only	24	Video Process Block Diagram	56
Voltage P6 and P7 Disconnected	26	D Board	58
Troubleshooting (No Power/Dead Unit)	27	Panel Drive Circuits	60

Table of Contents

Subject	Page #	Subject	Page #
No video, No OSD	62	IIC Mode of CAT	74
Physical Location of Connector DN6	63	Pattern generator	75
Audio Process	64	CD Mode	76
Adjustments	66	MS Mode	77
Adjustment Volume Location	67	IMP-1200 ATSC Digital Tuner Card with Pro:Idiom	78
Adjustment Test Point Location	68	IMP-1200 Specifications	79
Adjustment Procedure	69	IMP-1200 Compatibility	80
Initialization Pulse adjustment	70	Enseo HD 1000 HDMI Digital Tuner	81
Self-check	71	Enseo HD 1000 Specifications	82
Reset	72	HDC1000 Hospitality Clone Device	83
CAT Mode	73		

Topics

1. Boards Layout
2. Power supply/Standby/Power on
3. No power Troubleshooting
4. SOS Detect Circuit
5. Video/Audio Processing Circuit
6. Panel Drive Circuit
7. Service Man Mode
8. Self Check
9. Reset
10. Adjustments

TH-42PR10U Flexibility & Expandability



BNC Composite Video Terminal Board
(mounts in slot 1 or 2)
TY-42TM6B



RCA Component Video Terminal Board
(mounts in any slot)
TY-42TM6Z



HDMI Terminal Board
(mounts in slot 1 or 2)
TY-FB8HM



BNC Dual Video Terminal Board
(mounts in slot 1 or 2)
TY-FB9BD



Ir Through Terminal Board
(mounts in any slot)
TY-FB9RT



BNC Component Video Terminal Board
(mounts in any slot)
TY-42TM6A



RCA Composite Video Terminal Board
(mounts in slot 1 or 2)
TY-42TM6V



RGB (Digital) Terminal Board (DVI-D w/HDCP)
(mounts in slot 1 or 2)
TY-42TM6D



AV Terminal Box
TY-TB10AV

This unit provides handy input for audio/video equipment and personal computers. Installed on a desk or table, it allows guests to easily connect their own equipment to the plasma TV.



EUR7636070R
Remote Control

TH-42PH10U Flexibility & Expandability



Dual HDMI Terminal Board (mounts in slot 1 or 2)

TY-FB10HMD



HDMI Terminal Board (mounts in slot 1 or 2)

TY-FB8HM



RGB Active Through Terminal Board (mounts in slots 1 & 2)

TY-42TM6G



DVI-D Terminal Board (mounts in slot 1 or 2)

TY-FB9FDD (for PF series)

TY-42TM6D (for PH series)



Ir Through Terminal Board (mounts in any slot)

TY-FB9RT



PC Input Terminal Board (mounts in any slot)

TY-42TM6P



BNC Dual Video Terminal Board (mounts in slot 1 or 2)

TY-FB9BD



Composite/Component Video Terminal Board (mounts in slots 1 & 2, or slots 2 & 3)

TY-42TM6Y



BNC Component Video Terminal Board (mounts in any slot)

TY-42TM6A



RCA Component Video Terminal Board (mounts in any slot)

TY-42TM6Z



BNC Composite Video Terminal Board (mounts in slot 1 or 2)

TY-42TM6B



RCA Composite Video Terminal Board (mounts in slot 1 or 2)

TY-42TM6V



AV Terminal Box

TY-TB10AV

This unit provides handy input for audio/video equipment and personal computers. Installed on a desk or table, it allows guests to easily connect their own equipment to the plasma TV.

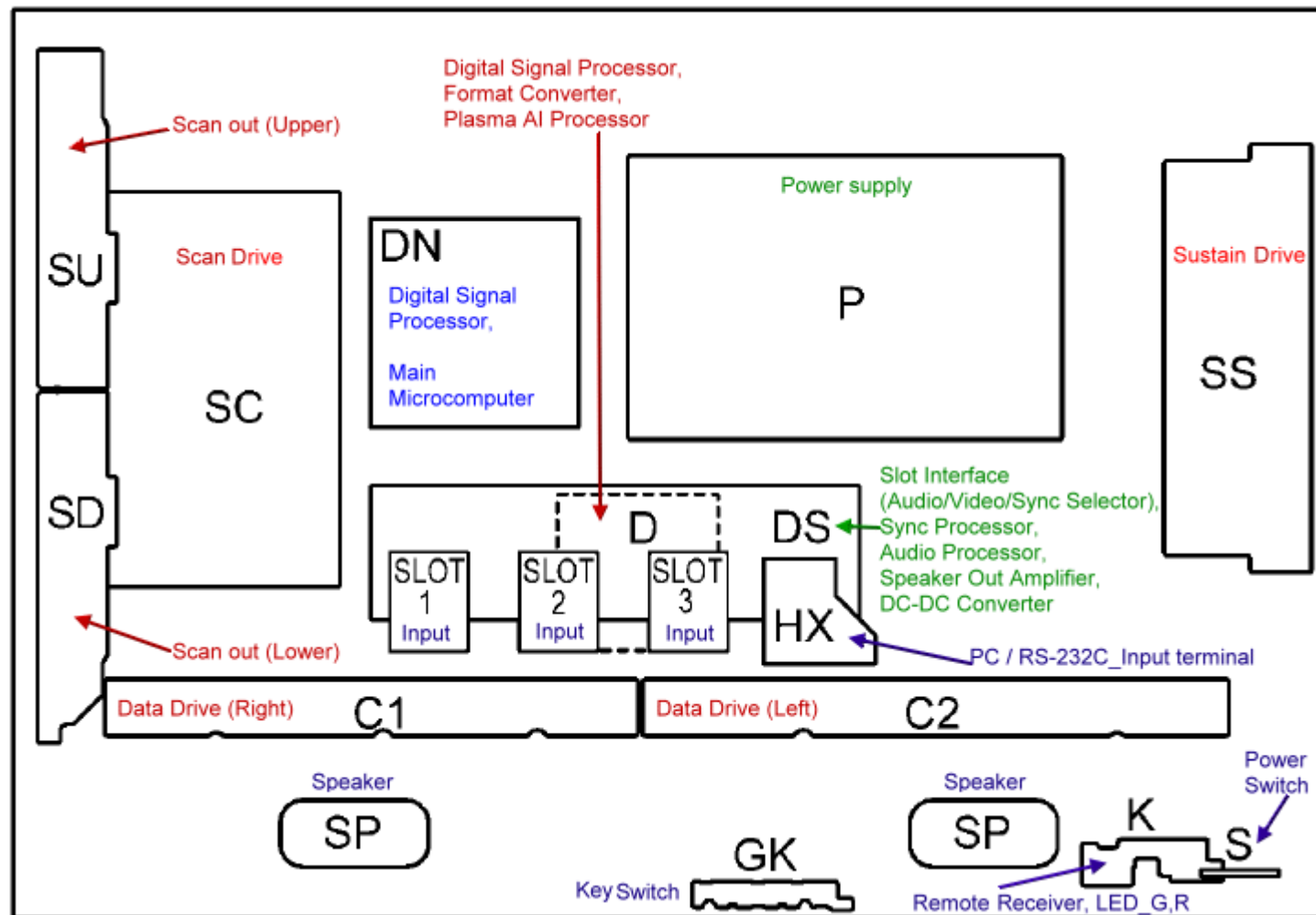


Wireless Presentation Board (mounts in slots 1 & 2, or slots 2 & 3)

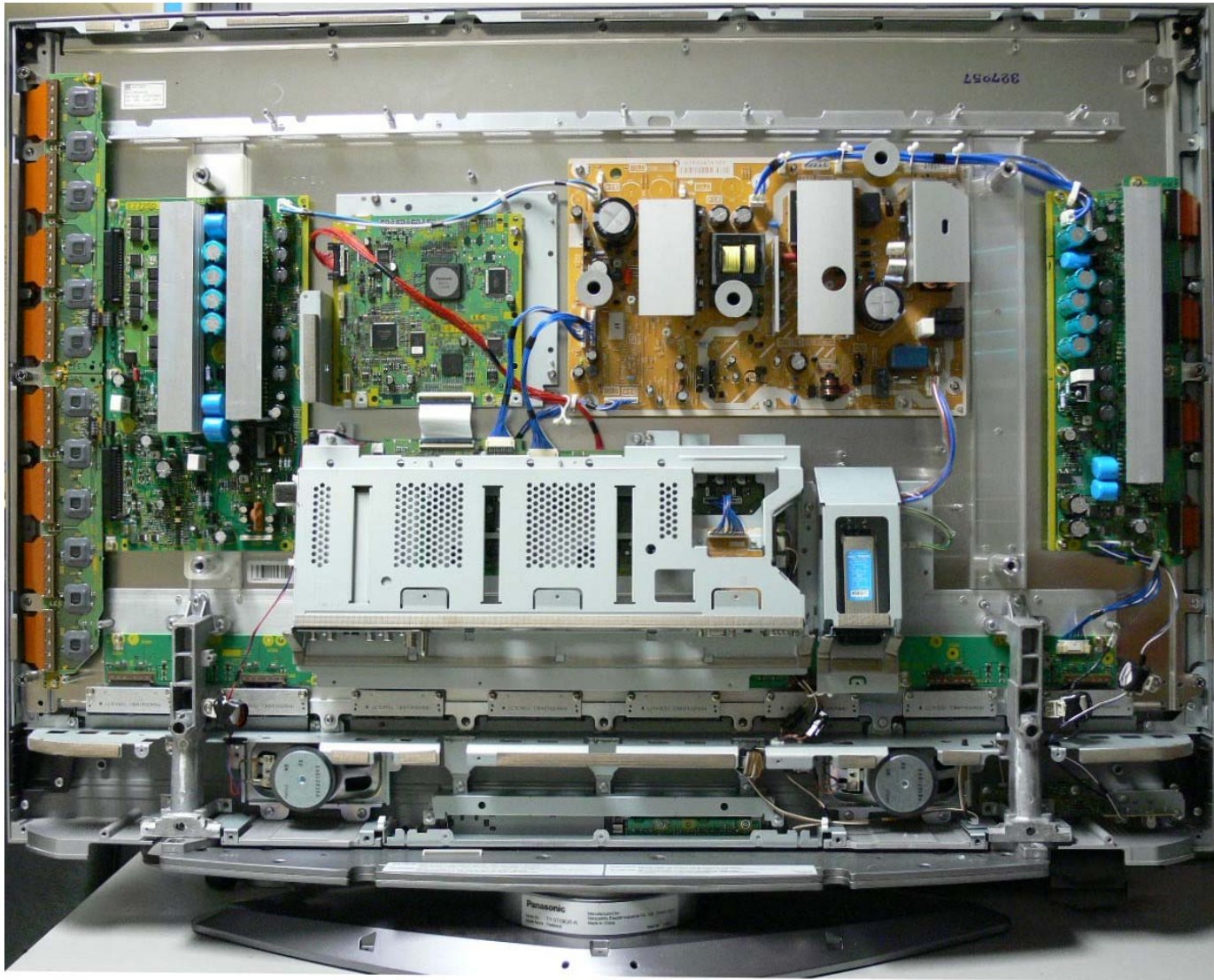
TY-FB10WPU

Board Layout

TH-42PR10UK Board Layout



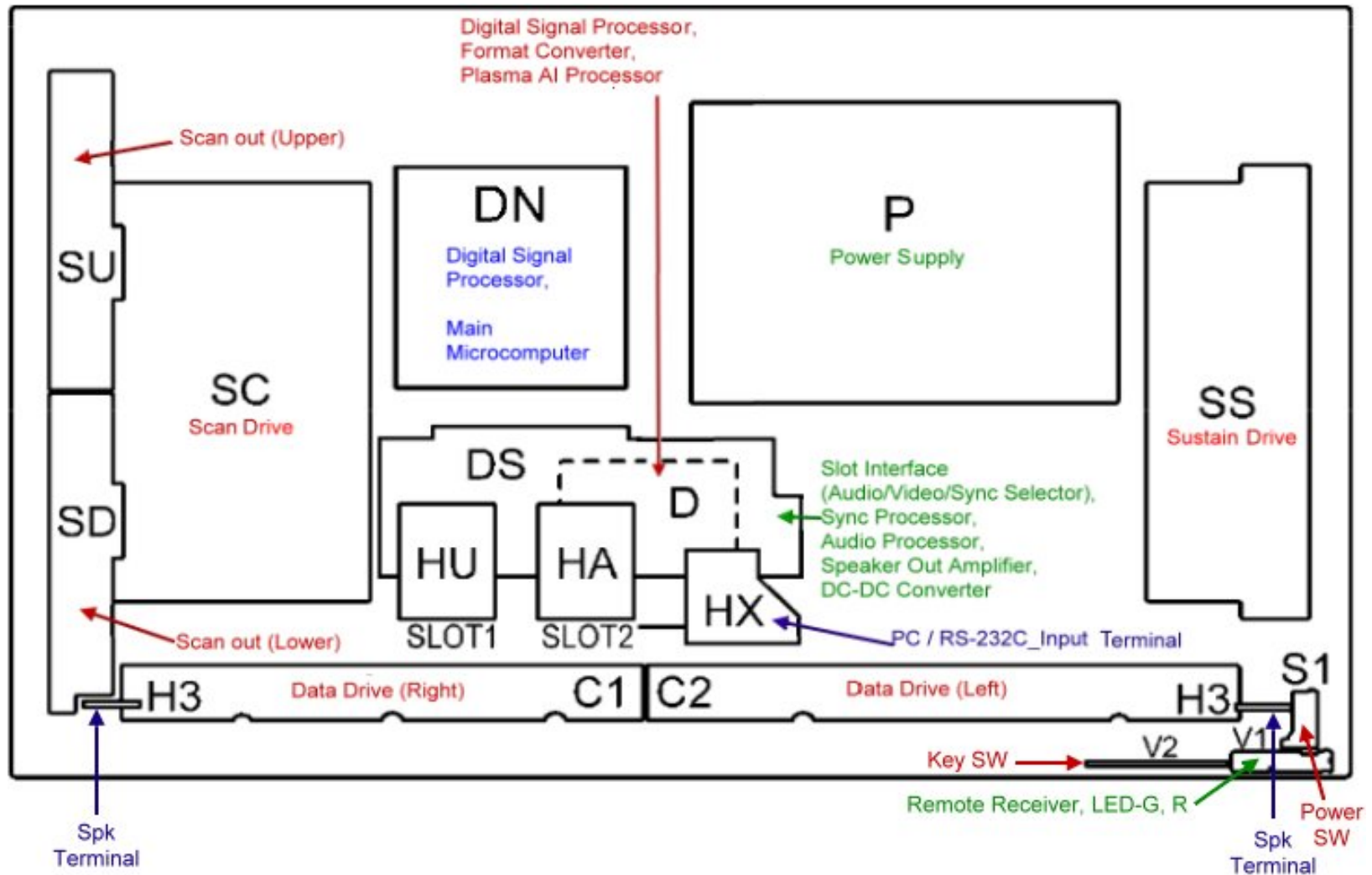
TH-42PR10UK Board Layout



TH-42PR10UK Board Description

Board Name	Function
DN	Digital Signal Processor, Microcomputer
D	Digital Signal Processor Format Converter, Plasma AI Processor
DS	Slot Interface (Audio / Video / Sync input Switch), SYNC Processor, Audio Processor, Speaker Out Amplifier, DC-DC Converter
SS	Sustain drive
SC	Scan drive
SU	Scan out (Upper)
SD	Scan out (Lower)
Board Name	Function
C1	Data Drive (Right)
C2	Data Drive (Left)
SP	Speaker terminal
S	Power switch
K	Remote receiver, LED_G,R
GK	Key switch
P	Power supply
HX	PC / RS-232C_Input terminal

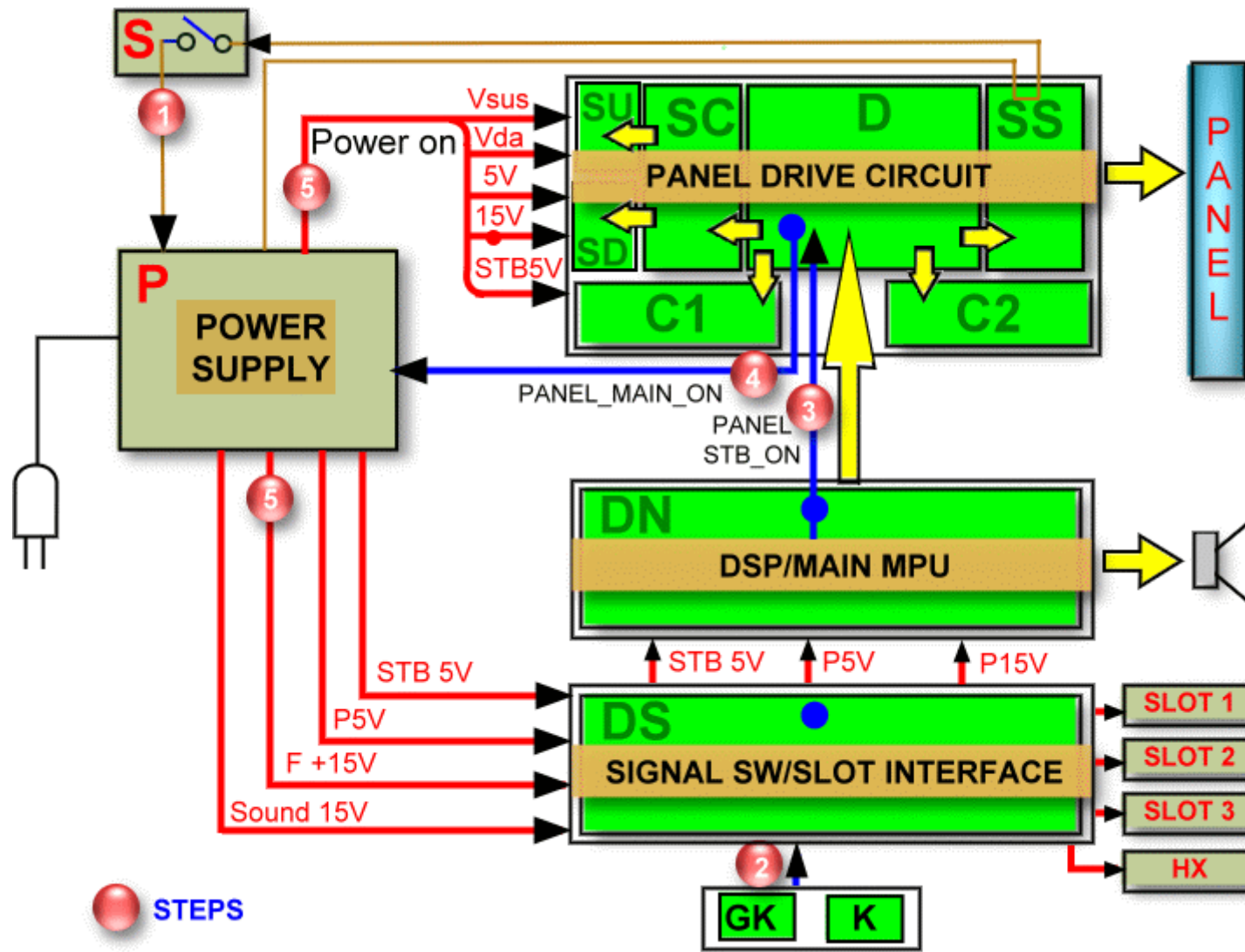
TH-42PH10UK Board Layout



TH-42PH10UK Board Description

Board Name	Function
DN	Digital Signal Processor, Microcomputer
D	Format Converter, Plasma AI Processor Sub-Field Processor
DS	Slot Interface (Audio / Video / Sync Input Switch), SYNC Processor, Audio Processor, Speaker Out Amplifier, DC-DC Converter
SS	Sustain drive
SC	Scan drive
SU	Scan out (Upper)
SD	Scan out (Lower)
C1	Data Drive (Right)
C2	Data Drive (Left)
H3	Speaker terminal
S1	Power switch
V1	Remote receiver, LED-G, R
V2	Key switch
P	Power supply
HX	PC / RS-232C Input terminal
HU	Dual Video terminal (BNC / S)
HA	Component Video terminal (BNC)

Overall Block Diagram



Overall Block Diagram

The operation of the plasma monitor can be divided into 3 different sections:

1. Power Supply Circuit

The power supply circuit board (P board) provides voltages to the Signal input/switching/processing circuit and the Panel drive circuit.

2. Signal Switching/Processing Circuit

Upon connecting the unit to the AC voltage source, the STB5V of the P board is developed but not output. The unit does not automatically enter the standby mode. Upon turning on the power switch, the STB5V is output to the DS and subsequently DN board for system control operation. The MPU then outputs commands to the D and P boards to output all voltages and fully turn on the unit. The F +15V is then provided to the DS board and subsequently the slot PCBs. The P+ 5V, Sound 15V, and P+15V are provided to the signal switching/processing and audio amplification circuits of the DS board. The P+5V and P+15V are also provided to the DN board's signal switching and RGB processing circuits.

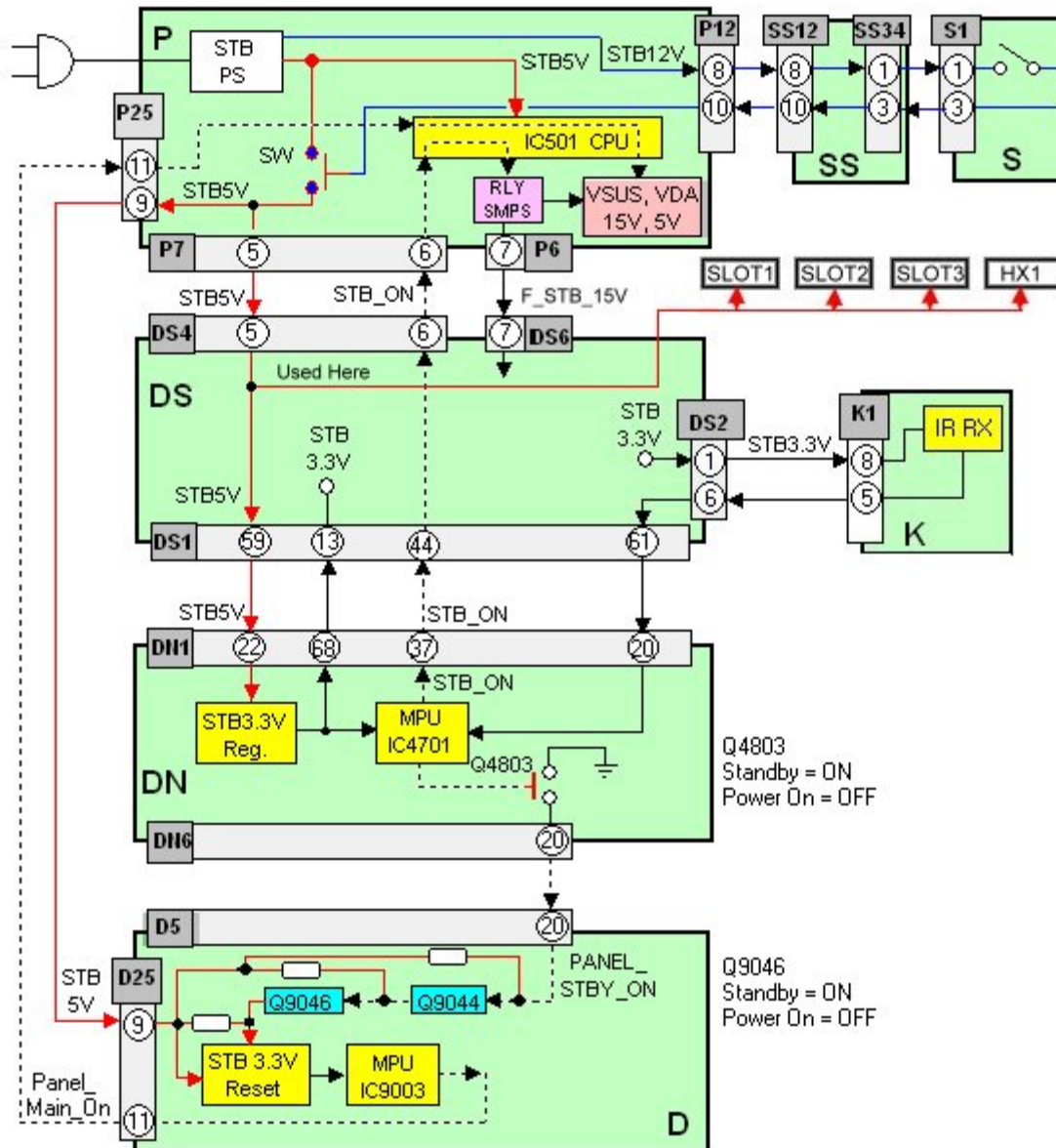
3. Panel Drive Circuit.

The Panel drive circuit receives the Vsus, Vda, 15V, and 5V sources from the P board when the unit is in operation.

4. To keep the unit in standby mode, the remote control (not the power switch of the unit) is used to turn the unit off. In this mode, the STB5V is continuously output to power the MPU, EEPROM, and remote control receiver

Power Supply

Power On Operation



Power On Operation

When AC is applied to the TV, the Standby circuit produces 5Vdc and 12Vdc. The 5Vdc enters the CPU IC501 and the collector of Q537. The 12Vdc passes through the SS board and enters the power switch of the S boards. Upon turning on the power switch, the 12Vdc is routed back into the power supply board to turn on Q537. As a result, the STB5V is output to the DS board, Slot boards and subsequently DN board. The STB5V is applied to a 3.3V regulator on the DN board to provide the supply voltage (STB3.3V) to the Main CPU (IC4701).

The STB3.3V is also provided to and used by the DS board, remote control receiver, and power LED on the K board.

When the main CPU, IC4701 on the DN board receives the 3.3V, it outputs the F_STBY_ON command (2.7V). The “F_STBY_ON” command is provided to the Power CPU (IC501) of the P board. IC501 activates the relay and turns on the switching supply to develop the F_STB+15V (F+15V).

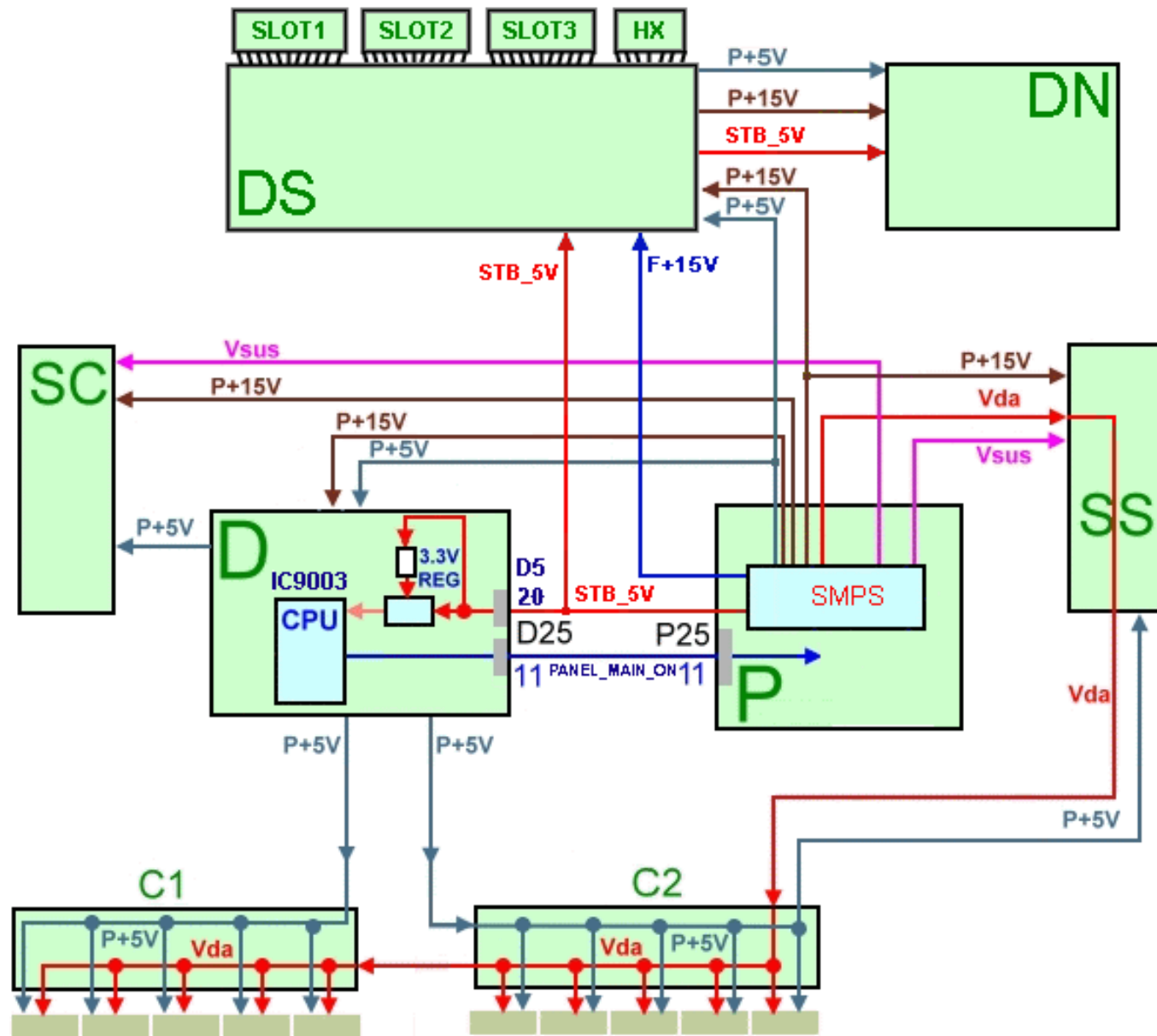
The F+15V is routed through the DS board and applied to the slot PCBs.

The main CPU IC4701 also outputs the “PANEL_STB_ON” command to turn off the switch Q4803 and allow pin 20 of the connector DN6/D5 to go high.

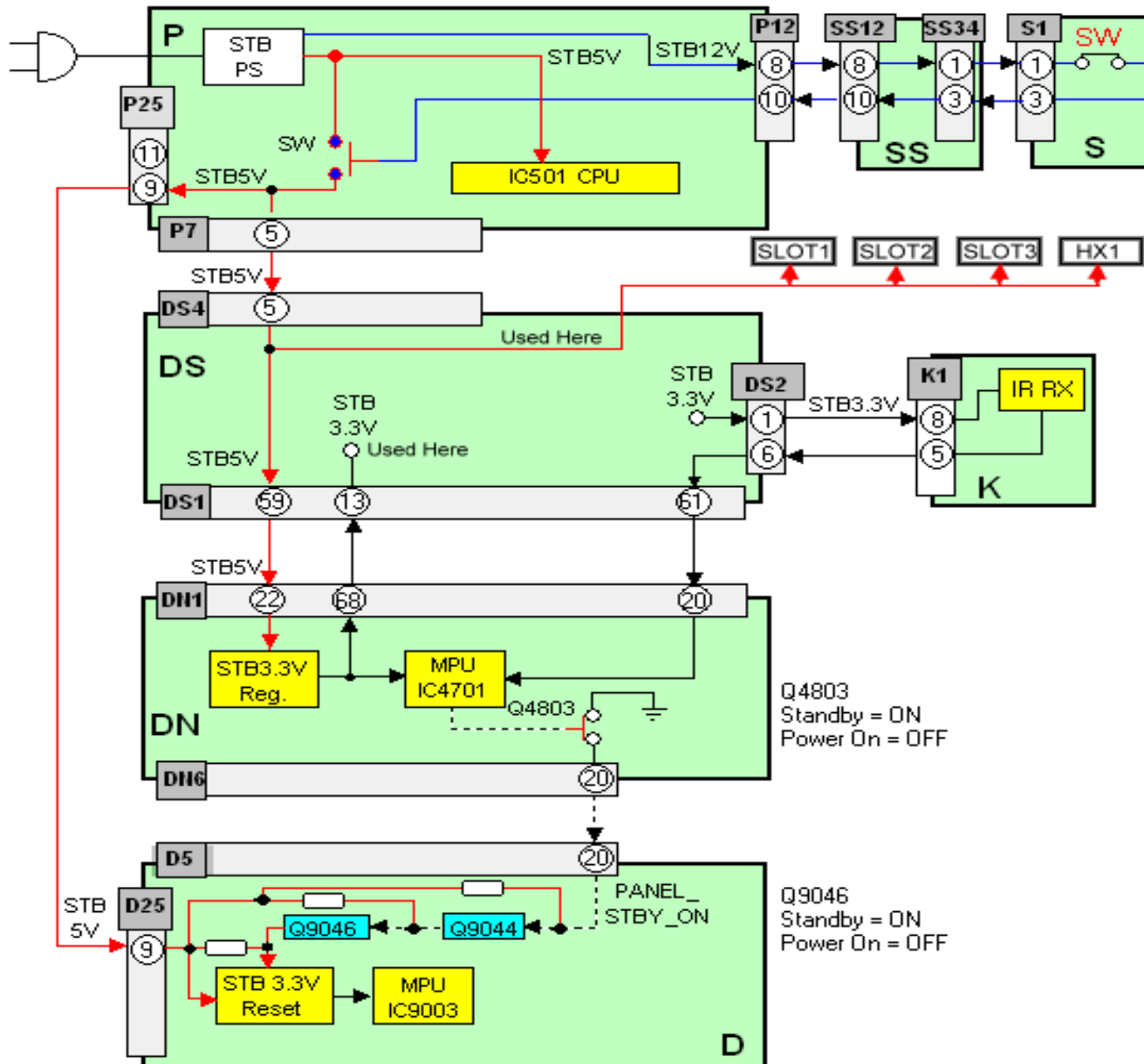
On the D board, the “PANEL_STB_ON” command causes Q9044 to turn on and Q9046 to turn off. As a result, the STB3.3V regulator turns on and provides its output to the CPU (IC9003). When the CPU is energized, it outputs the “PANEL_MAIN_ON” command.

The PANEL MAIN ON command turns on the portion of the power supply circuit that outputs the Vsus, Vda, 15V, and 5V. These voltages are applied to the panel drive circuits.

Voltage Distribution When the Unit is On



Standby Power



Standby Power

To keep the unit in standby mode, the remote control (not the power switch of the unit) is used to turn the unit off. In this mode, the STB5V is continuously output to power the MPU, EEPROM, and remote control receiver

The Standby circuit of the P board produces 5Vdc and 12Vdc. The 5Vdc enters the CPU IC501 and the switch Q537. The 12Vdc passes through the SS board and enters the power switch of the S boards. Since the unit was turned off by the remote control, the power switch is on and the 12Vdc is routed back into the power supply board to turn on Q537. As a result, the STB5V is output to the DS board and subsequently DN board. The STB5V is applied to a 3.3V regulator on the DN board to provide the supply voltage (STB3.3V) to the Main CPU (IC4701).

The STB3.3V is also provided and used by the DS board and remote control receiver, power LEDs of the K board.

The STB5V source is also provided to the RESET/STB3.3V regulator of the D board. The output of this circuit is controlled by the “STB3.3V ON/OFF” circuit that consists of transistors Q9044 and Q9046 and Q4803 of the DN board. During standby the MPU of the DN board turns Q4803 on. As a result Q9044 is off and Q9046 is on keeping the regulator and the panel drive circuit off.

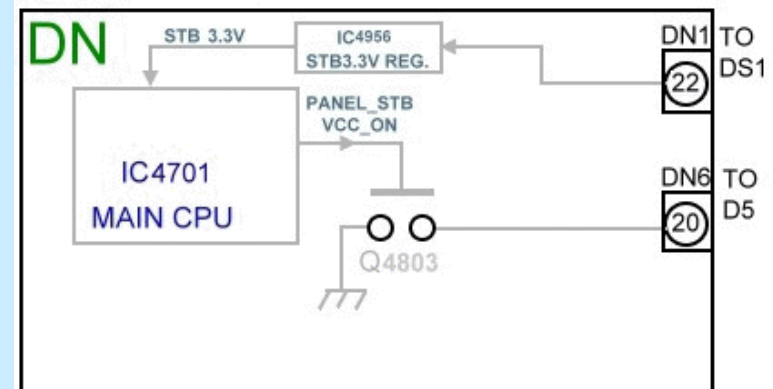
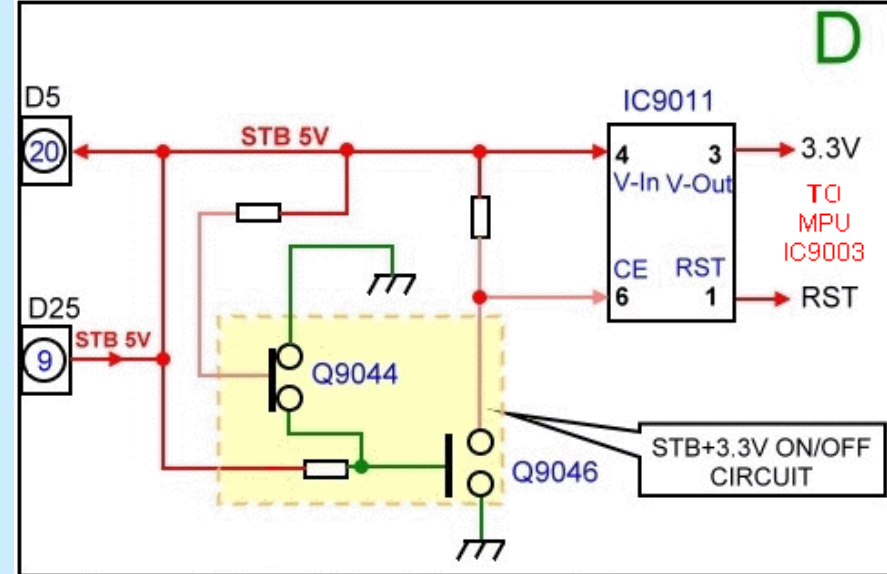
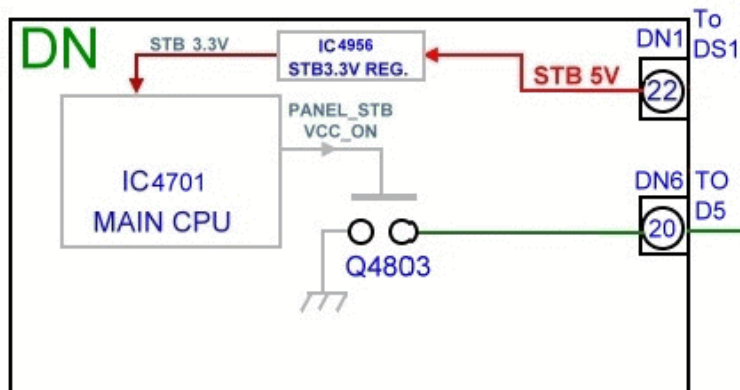
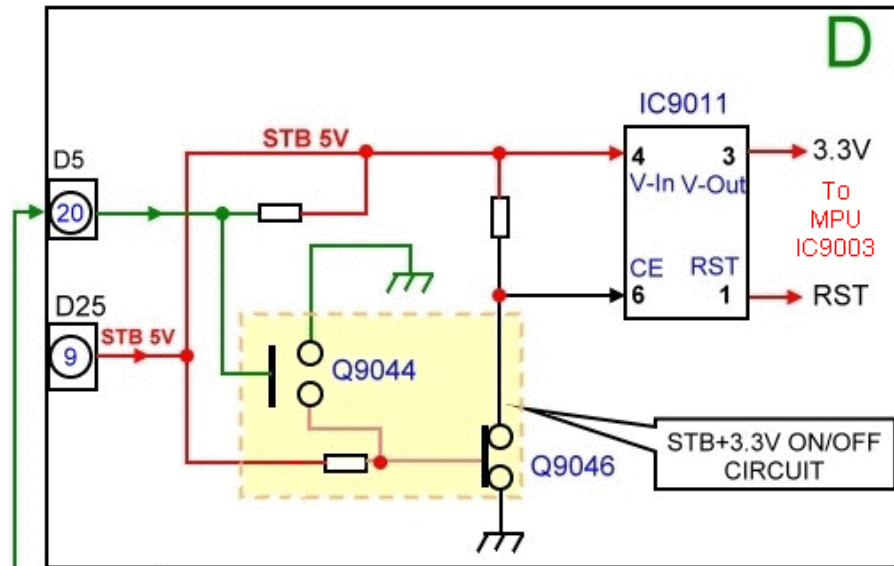
The STB5V source is also provided to the Slot PCBs in case a remote control board is used.

The STB5V source is also used by several ICs of the DS board. Keep in mind that a short circuit on the Ds or any of the slot board may keep the unit from powering up.

Circuit Operation When DN6/D5 is Disconnected

Normal

DN6/D5 Disconnected



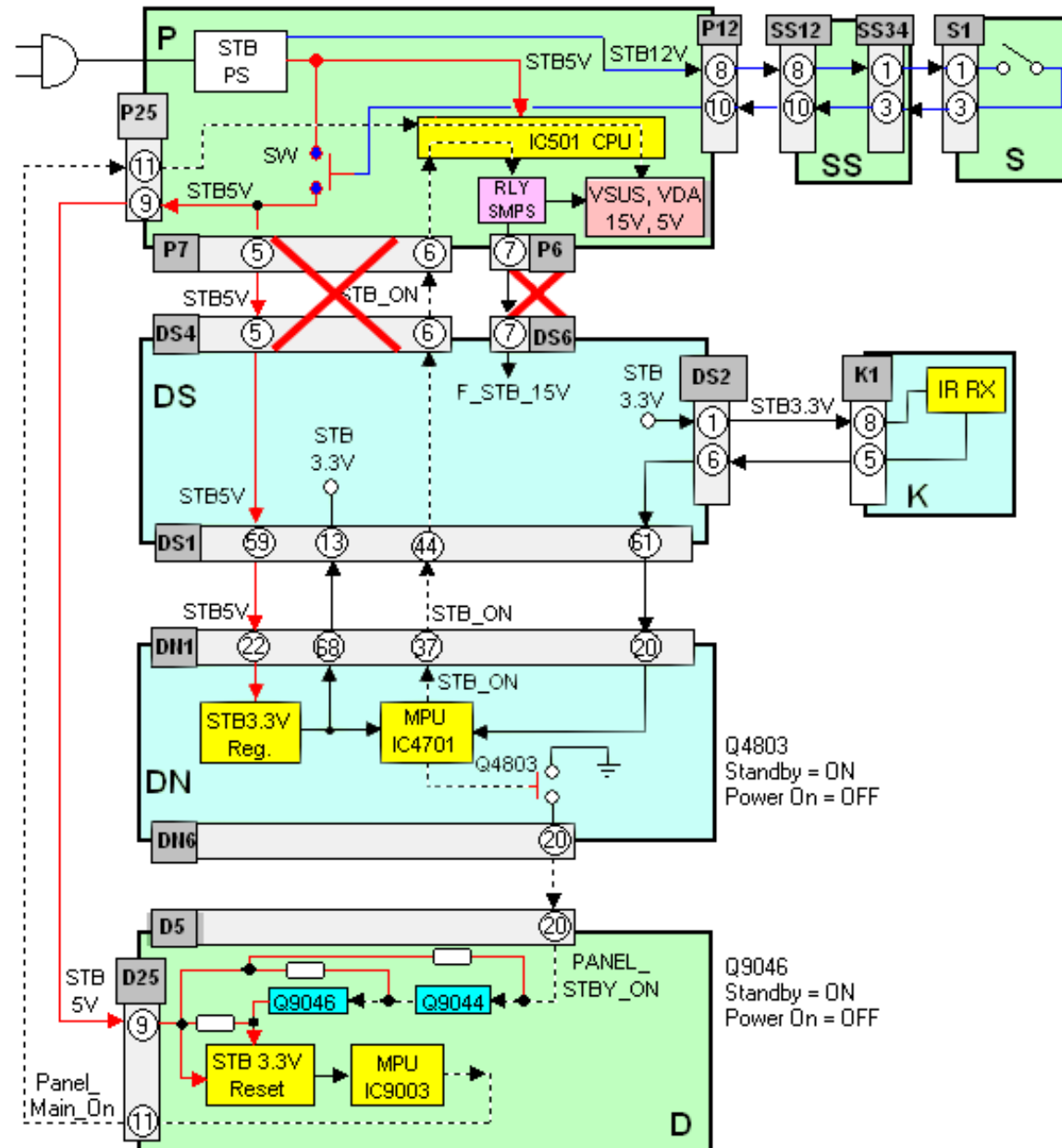
Circuit Operation When DN6/D5 is Disconnected

By disconnecting the connector DN6/D5, the panel can be forced to automatically turn ON. This duplicates the same effect that the **“Panel STB/Panel VCC On”** command has on the CPU of the D board. (**“Panel STB On VCC”** is normally output from the DN board when the power is turned on. When DN6/D5 is disconnected, the base of Q9044 on the D board is no longer grounded by Q4803 on the DN board. As a result of this, Q9044 is turned on grounding the base of Q9046 to turn it off. When Q9046 is off, the “chip enable” pin of the 3.3V regulator goes high, allowing for “reset” and 3.3V to be output to the MPU IC9003 on the D board. When IC9003 receives the 3.3V and the reset pulse, it outputs the “Main ON” command (3.2V) to the power supply. The power supply turns on and outputs the Vda, P+15V, P+5V, and Vsus voltages to turn on the “Panel Drive Circuit”. When the “Panel Drive Circuit” is on, the LEDs on the Scan and Sustain board are lit. A white screen should also be displayed.

This could be useful when troubleshooting a “No Power” or a “Distorted Picture” condition. Do not let the TV run for more than 30 seconds when DN6/D5 is disconnected.

Note: Disconnecting DN6/D5 is not useful for troubleshooting shutdown conditions. When the power supply is on, all voltages including the F+15V are output.

Method To Turn On The Panel Drive Circuit Only



Method To Turn On The Panel Drive Circuit Only

The result obtained when DN6/D5 is disconnected is not useful for troubleshooting shutdown problems. P6/DS6 and P7/DS4 can now be disconnected to turn on the panel drive circuit only.

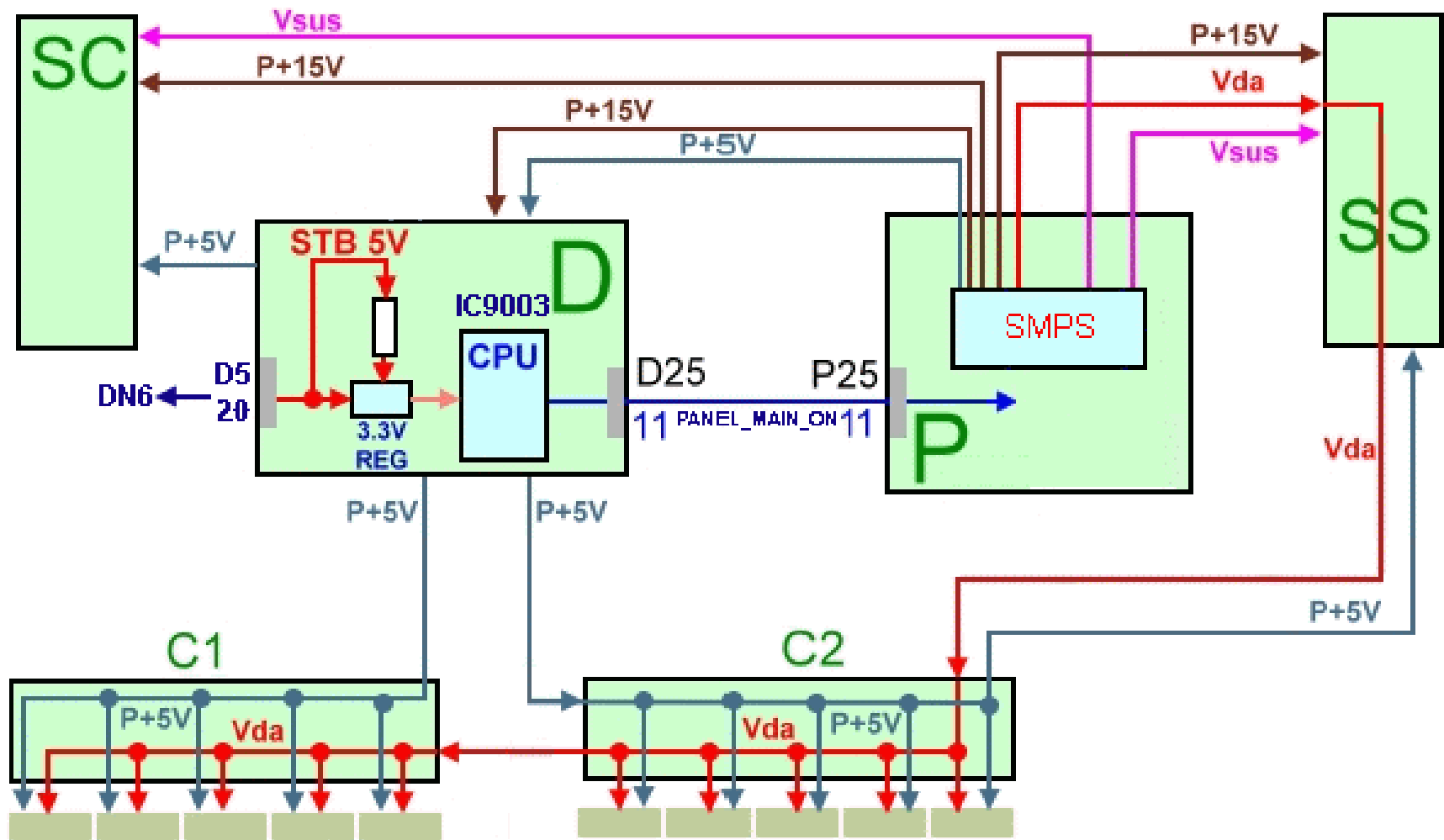
When these connectors are removed, the DS, DN, K and slot boards are disabled.

Normally Pin 20 of connector DN6 is grounded by Q4803. When P6/DS6 and P7/DS4 are disconnected pin 20 is no longer grounded. This allows for the 3.3V regulator on the D board to output 3.3V to the Panel CPU (IC9003).

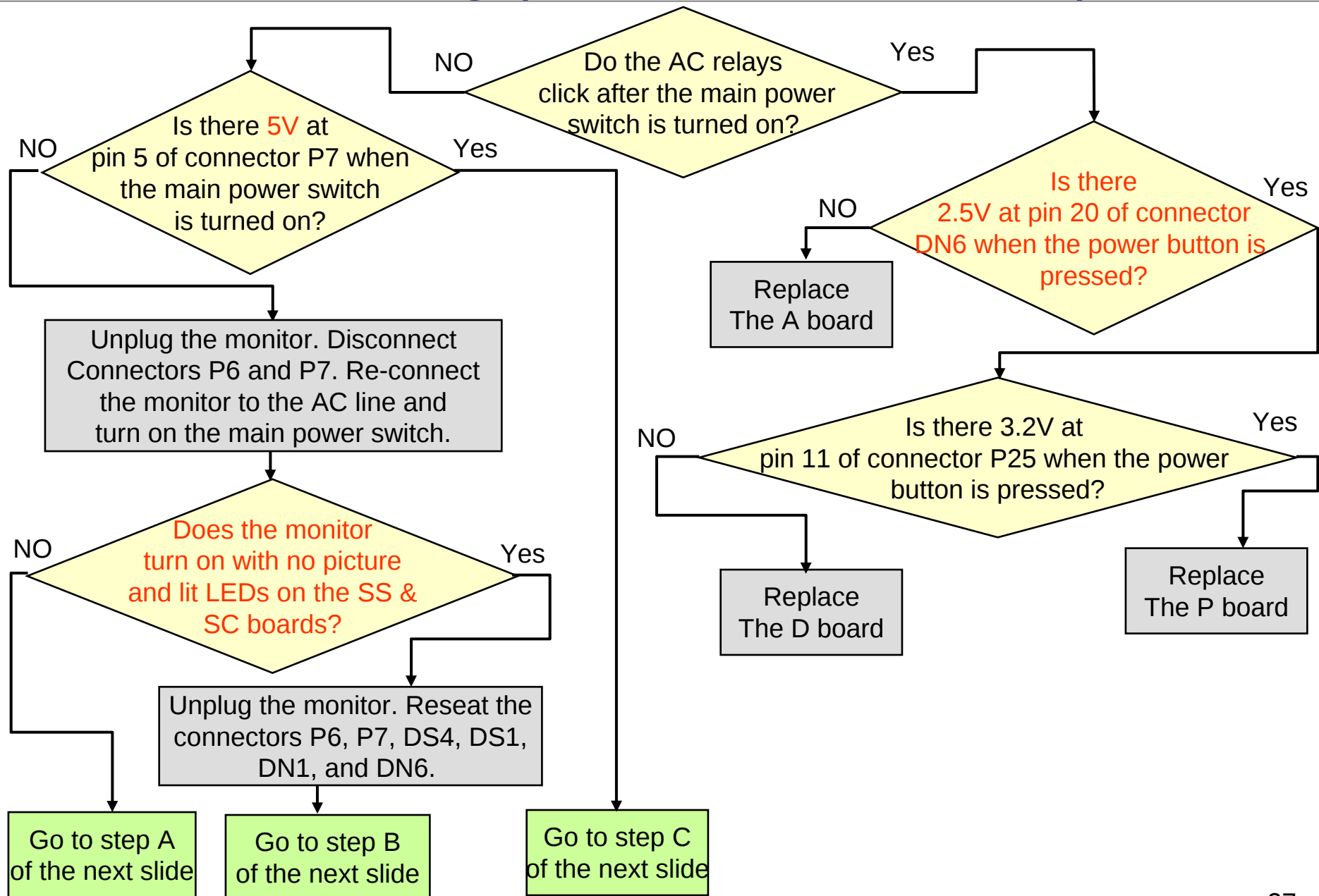
The Panel CPU (IC9003) outputs the “Panel Main On” command (3.2V) that is connected to pin 11 of connector P25 on the power supply board. This triggers the power supply to operate and generate Vsus, Vda, P15V, and P5V.

This method of isolation is useful when troubleshooting problems where the DS, DN, or K board is suspected to be the cause of a shutdown.

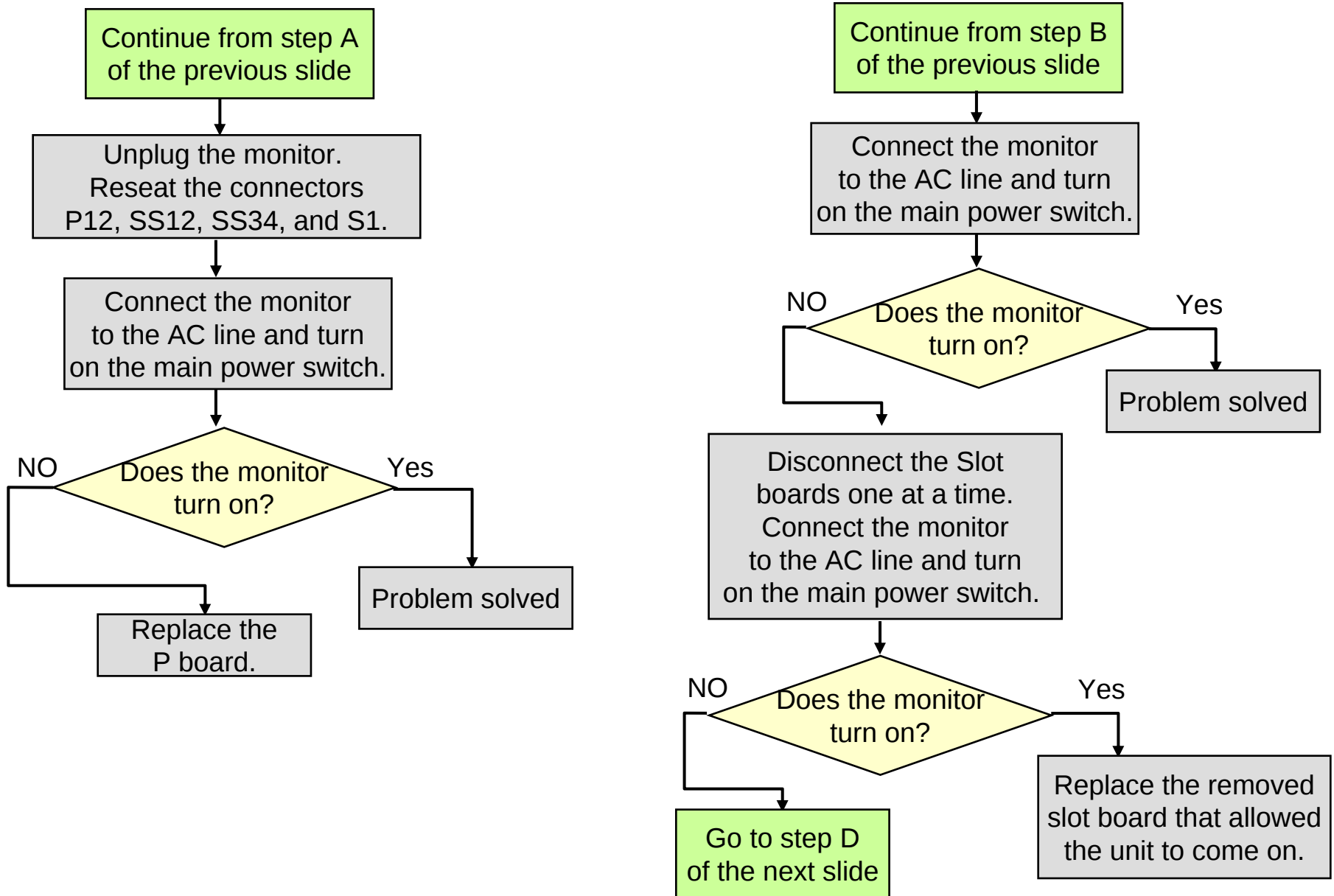
Voltage Distribution _P6 and P7 Disconnected



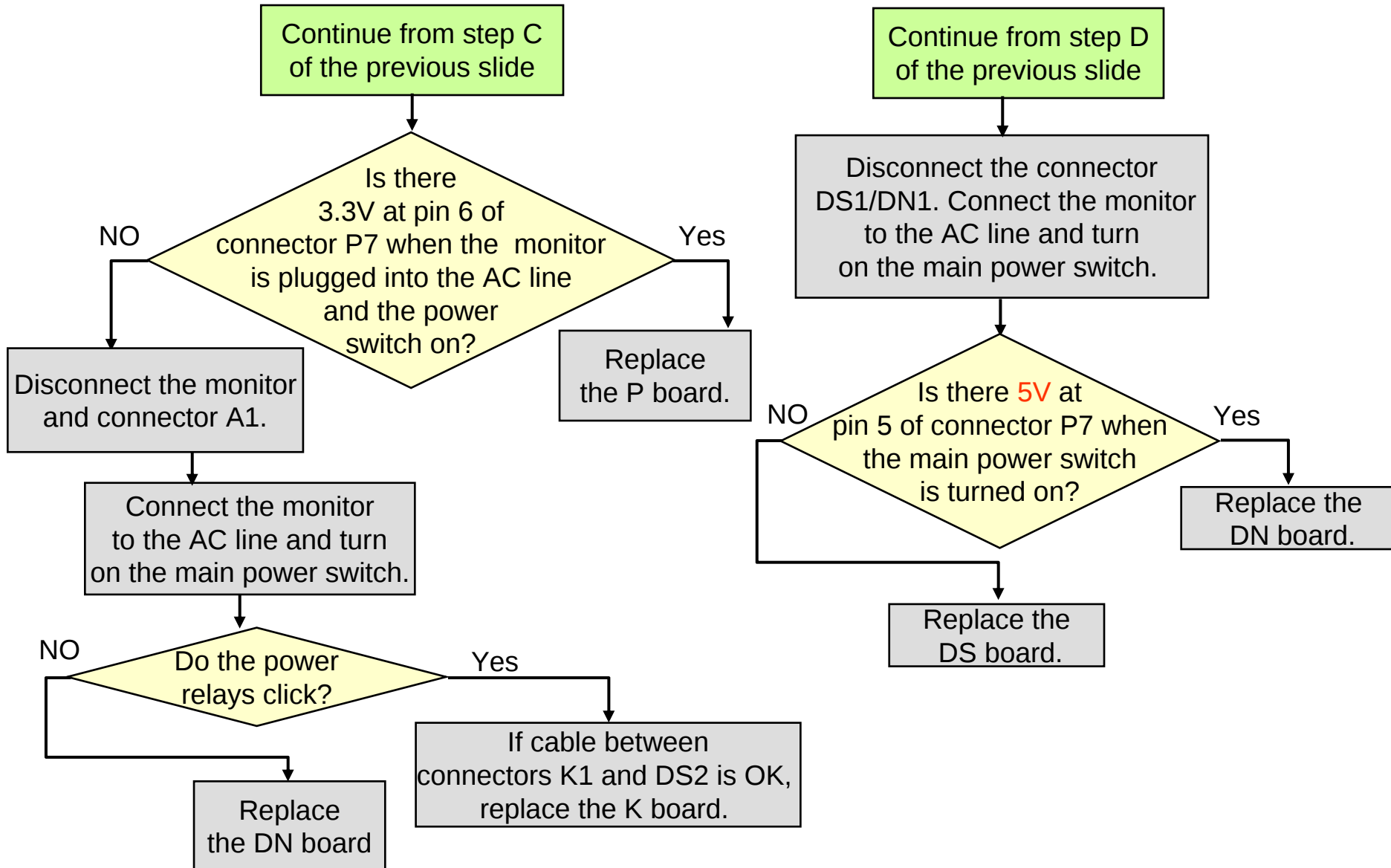
Troubleshooting (No Power/Dead Unit) Part 1



Troubleshooting (No Power/Dead Unit) Part 2



Troubleshooting (No Power/Dead Unit) Part 3



Shutdown Circuits

SOS DETECT ***(SHUTDOWN)***

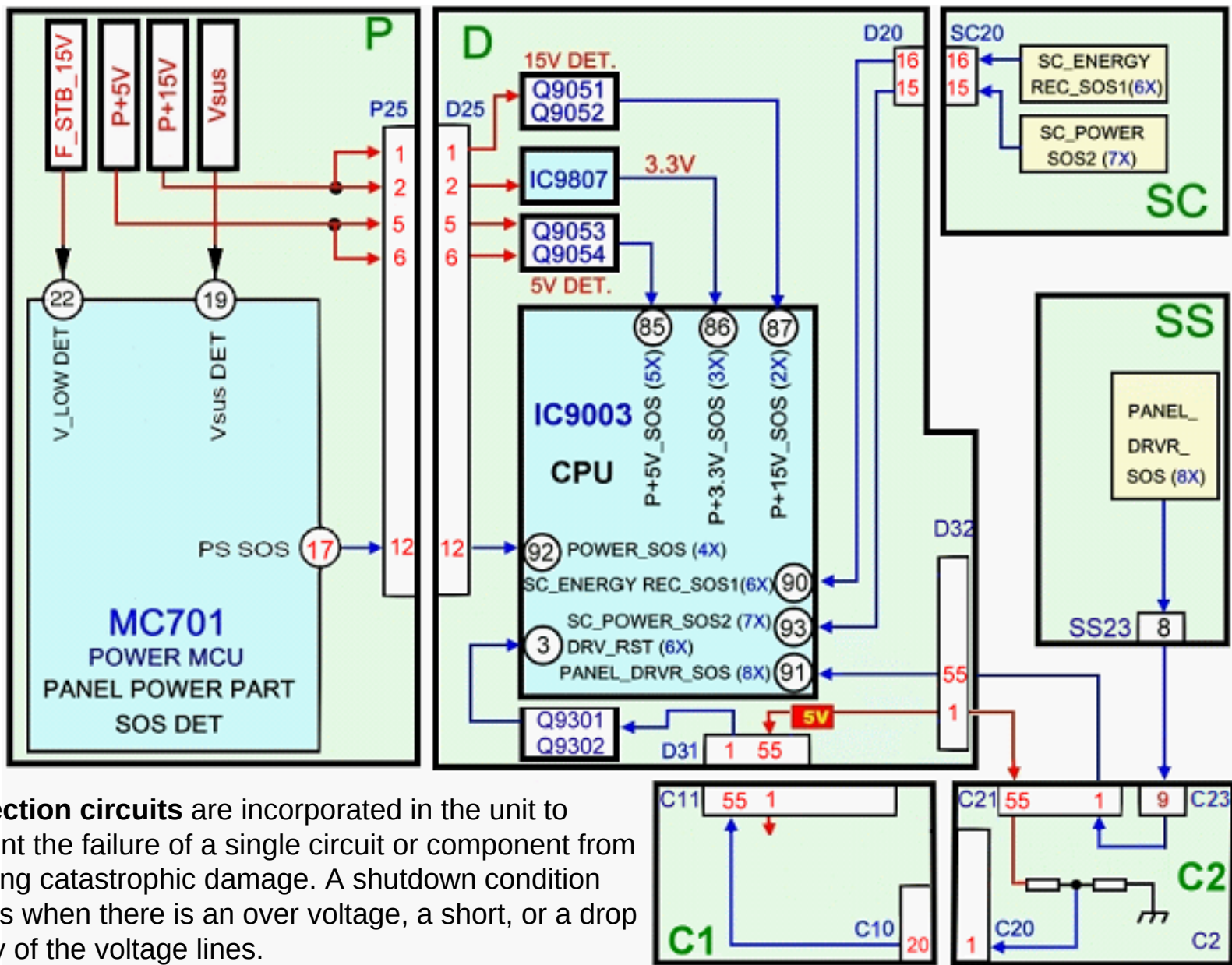
When an abnormality occurs in the unit, the “SOS Detect” circuit is triggered and the TV shuts down. The power LED on the front panel will flash a pattern indicating the circuit that has failed.

SOS Detection Timing Table

When an abnormality is detected, the protection circuit resets the unit to the standby mode. The DN board microprocessor causes the power LED to blink a number of times. The number of blinks points to the board(s) where the abnormality is detected.

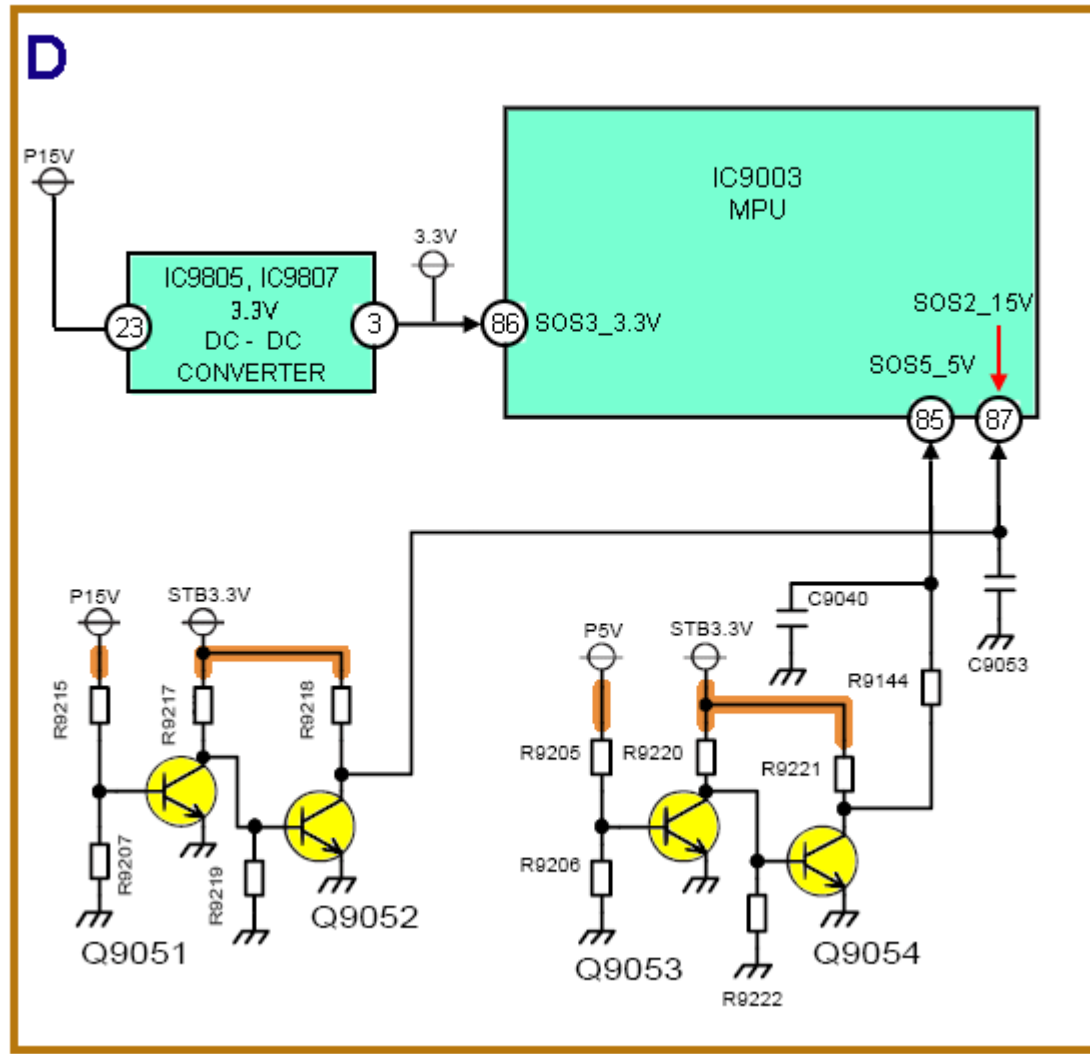
Number of Blinks	Blinking Timing	Contents	Check Point
1		No Particular Test Point	—
2		15V SOS	P-Board D-Board DN-Board
3		3.3V SOS	D-Board DN-Board
4		POWER SOS	P-Board
5		5V SOS	P-Board D-Board DN-Board
6		Driver SOS 1	SC-Board
7		Driver SOS 2	SU-Board SD-Board SC-Board
8		Driver SOS 3	SS-Board
9		Panel Configuration	D-Board
10		Terminal Board SOS	Terminal Board DS-Board

SOS Detect Circuit (D Board)



Protection circuits are incorporated in the unit to prevent the failure of a single circuit or component from creating catastrophic damage. A shutdown condition occurs when there is an over voltage, a short, or a drop in any of the voltage lines.

15V, 3.3V, and 5V SOS Detect Circuit (D Board)



15V, 3.3V, and 5V SOS Detect Circuit (D Board)

2 Blinks SOS: Pin 87 of the CPU IC9003 monitors the 15V line. During normal operation, the transistors Q9051 and Q9052 output a high to pin 87. If the 15V line is missing or shorted, a low is provided to pin 87. As a result, the unit shuts down and the power LED blinks 2 times.

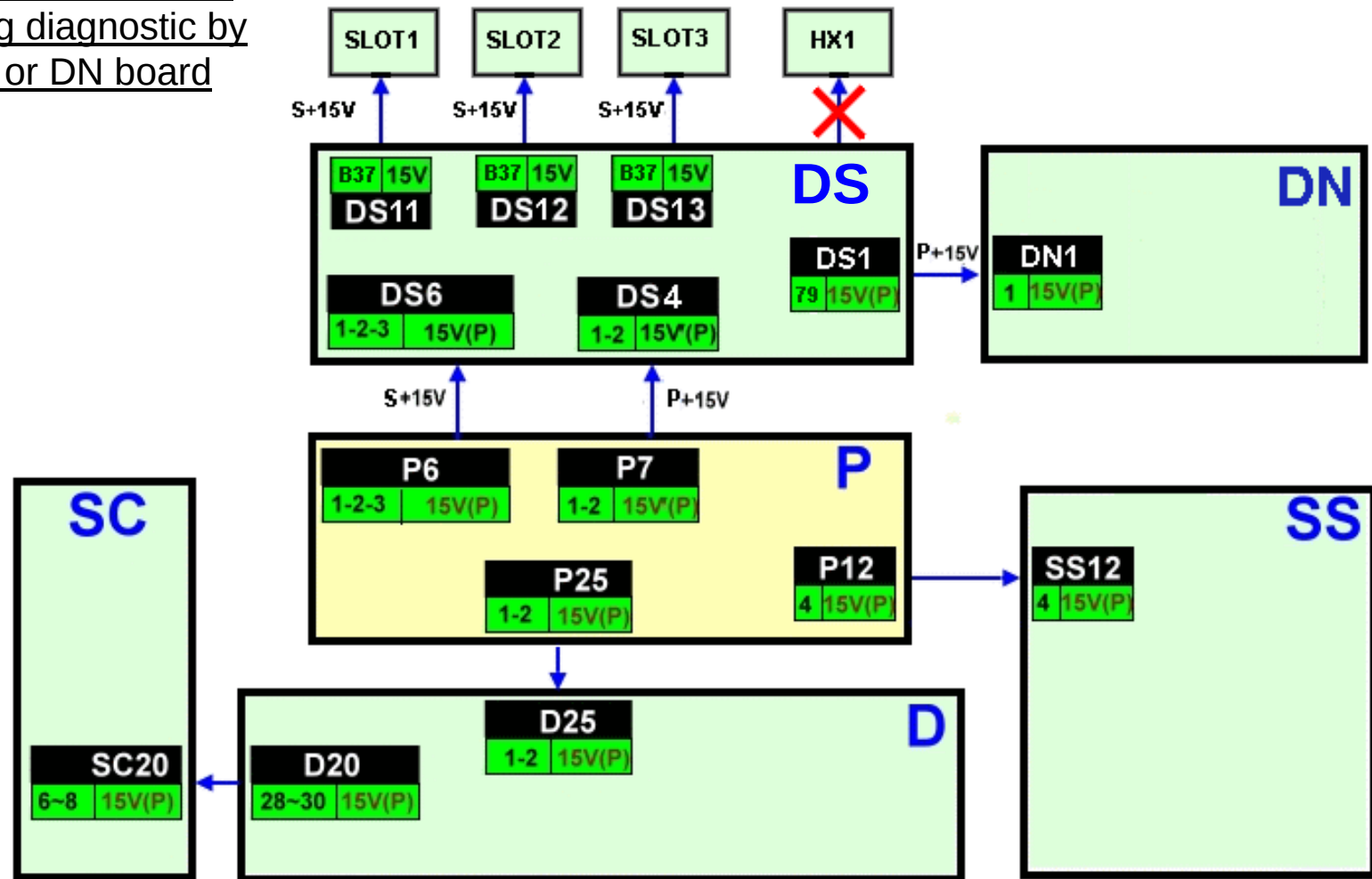
3 Blinks SOS: IC9805~IC9807 is a 3.3V regulator located on the D board. Its output is monitored by IC9003. If the 3.3V is not present at pin 86, the MPU shuts down the unit. The power LED blinks 3 times.

5 Blinks SOS: Pin 85 of the CPU IC9003 monitors the 5V line. During normal operation, the transistors Q9053 and Q9054 output a high to pin 85. If the 5V line is missing or shorted, a low is provided to pin 85. As a result, the unit shuts down and the power LED blinks 5 times.

Circuit Board Associated with 2 Blinks

These 3 conditions can cause the TV to shutdown and the power LED to blink 2 times

1. Missing P15V
2. A short of the P15V
3. Wrong diagnostic by the D or DN board

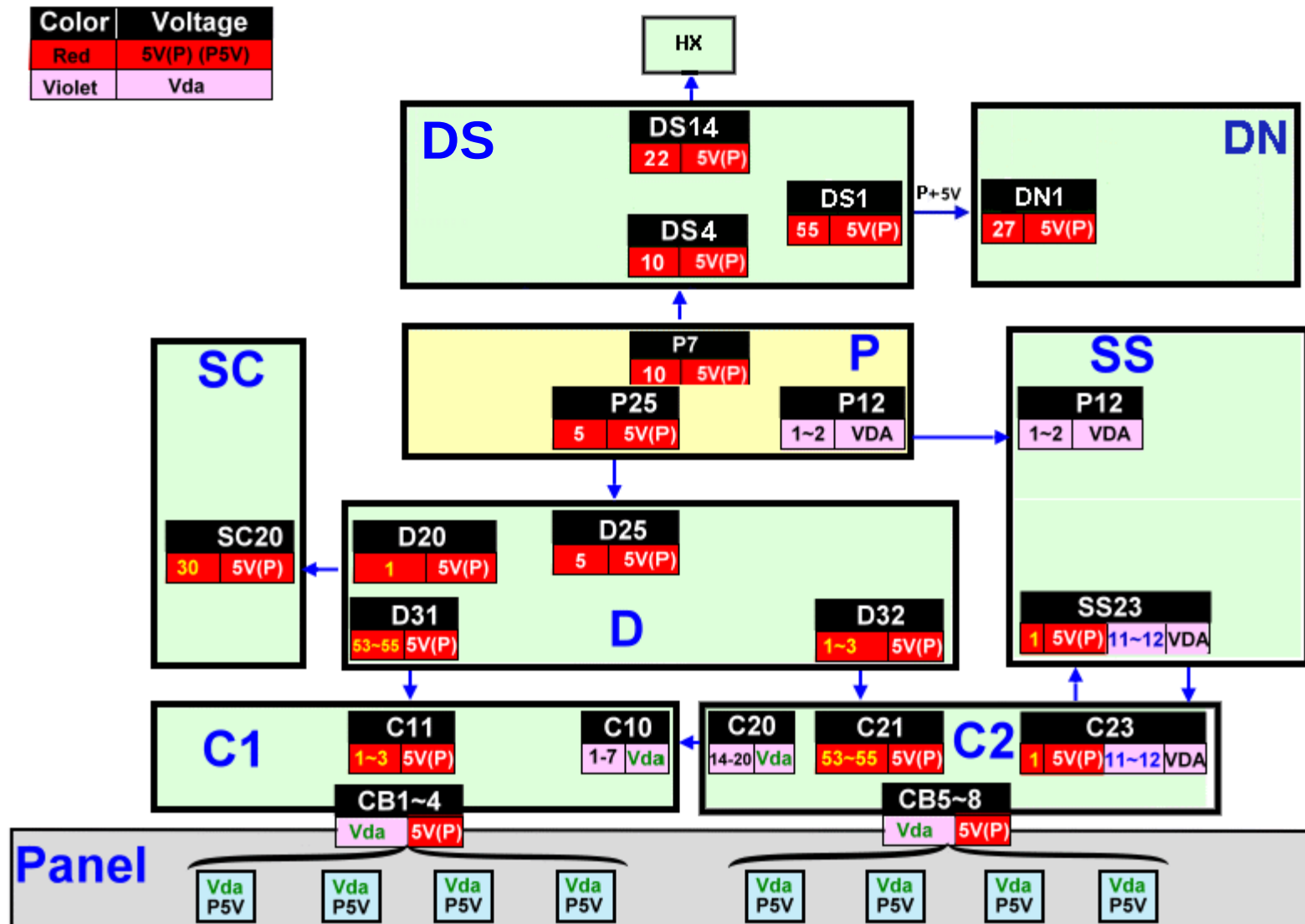


Troubleshooting 2 Blinks Error Code

When troubleshooting a PDP monitor that is shutting down and the power LED blinks 2 times:

1. Reseat all the connectors and turn the unit on. The problem may be a loose connection.
2. Try to run the panel alone by disconnecting the connectors P6, P7 and DN6. Be sure to turn on the power switch. If the panel comes on and display a white screen, the problem area is the DS, DN, or a slot board. If the relay clicks and immediately clicks off, the problem area is the panel drive section. Knowing this information is useful in eliminating a portion of the unit as the source of the problem.
3. Find out if 15V is output at pin 1 of connector P7 of the P board right before shutdown. If 15V is output, the problem may be a loose connection. If no voltage is output, measure resistance between pin 1 of connector P7 and ground (Chassis). If the 15V line is shorted, find out if the short is located on the P board or any of the other boards that the 15V is connected to. If the P board is OK, disconnect the connectors providing the P15V to all these boards while measuring resistance between pin 1 of connector P7 and ground. The defective board is found when the connector that provides the P15V to that board is removed and the short circuit is no-longer present.

Circuit Board Associated with 5 Blinks and VDA Distribution



Circuit Board Associated with 5 Blinks and VDA Distribution

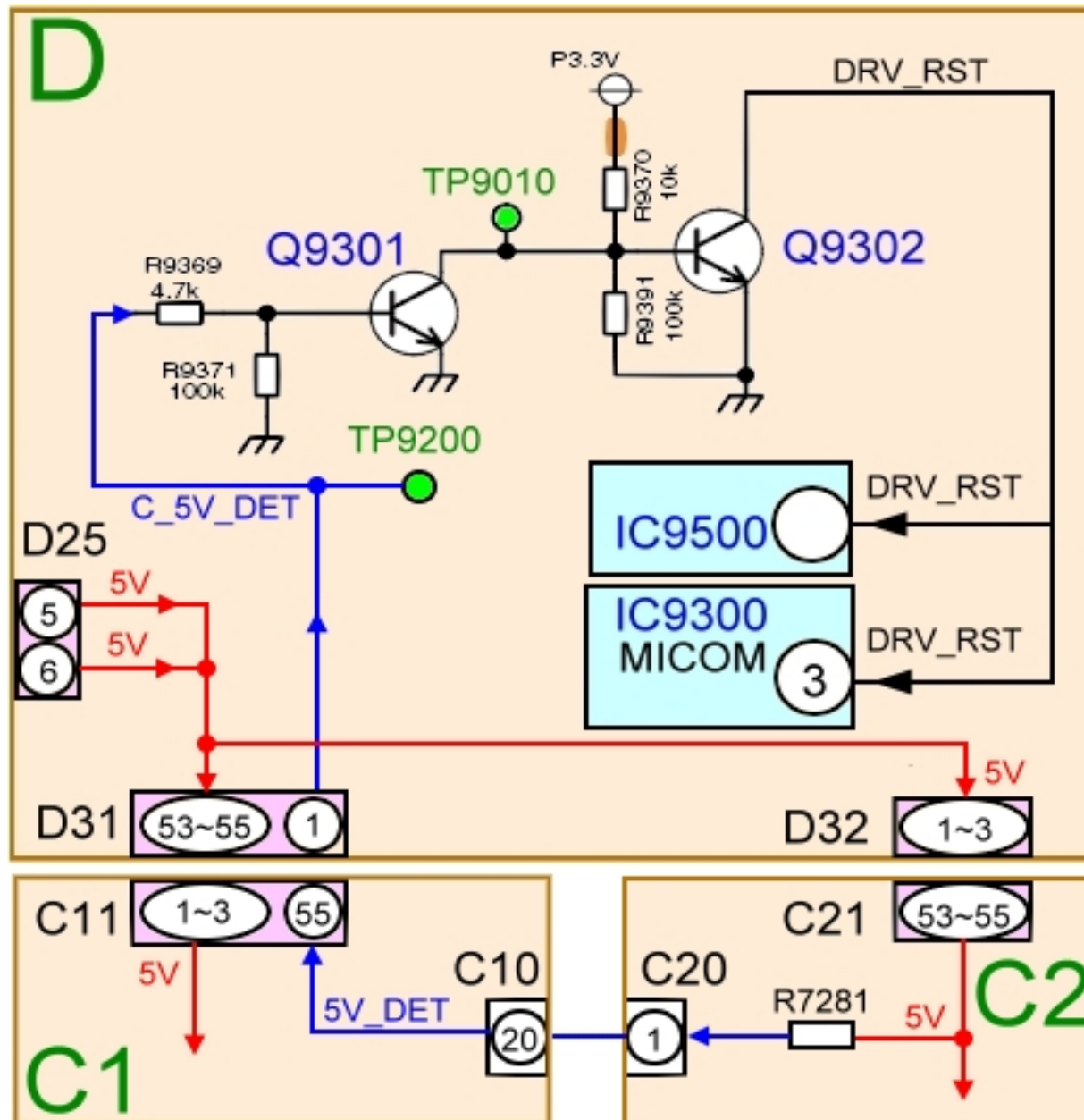
These 4 conditions can cause the TV to shutdown and the power LED to blink 2 times

1. Missing P5V
2. A short of the P5V
3. A short of the Vda line (Note: missing Vda from the P board does not cause 5 blinks)
4. Wrong diagnostic by the D or DN board

When troubleshooting a PDP TV that is shutting down and the power LED blinks 5 times:

1. Reseat all the connectors and turn the unit on. The problem may be a loose connection.
2. Try to run the panel alone by disconnecting the connectors P6, P7 and DN6. Be sure to turn on the power switch. If the panel comes on and display a white screen, the problem area is the DS, DN, or a slot board. If the relay clicks and immediately clicks off, the problem area is the panel drive section. Knowing this information is useful in eliminating a portion of the unit as the source of the problem.
3. Find out if pin 1 of connector P12 is shorted to ground. If it is, possibly the panel is bad. If there is no short circuit, proceed to check the P5V line. Find out if 5V is output at pin 5 of connector P25 of the P board. If no voltage is output, measure resistance between pin 5 of connector P25 and ground (Chassis). If a shorted 5V is detected, find out if find out if the short is located on the P board or any of the other boards that the 5V is connected to. If the P board is OK, disconnect the connectors providing the P5V to all these boards while measuring resistance between pin 5 of connector P25 and ground. The defective board is found when the connector that provides the P15V to that board is removed and the short circuit is no longer present.

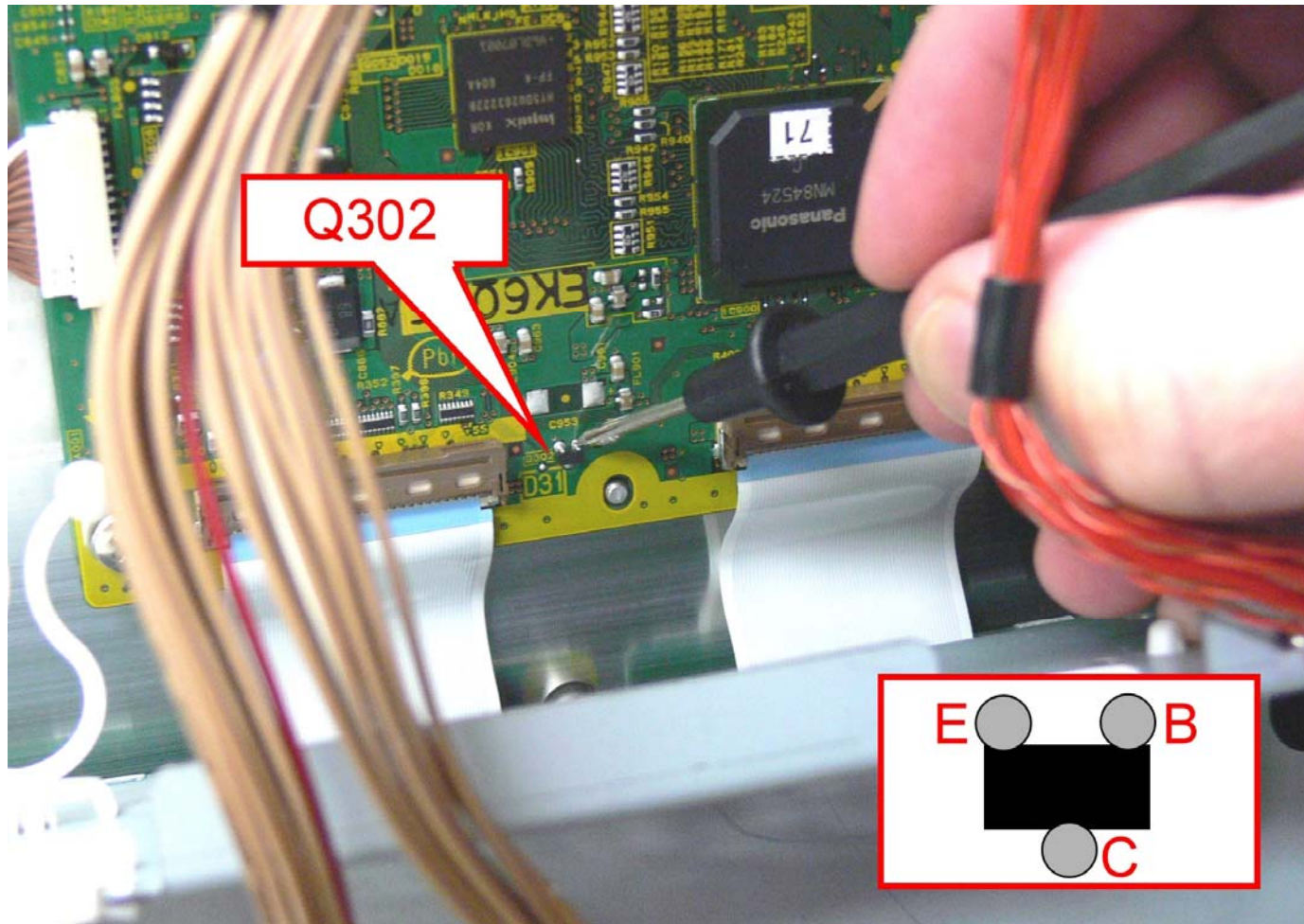
Drive Reset (TH-42PR10U)



Drive Reset (TH-42PR10U)

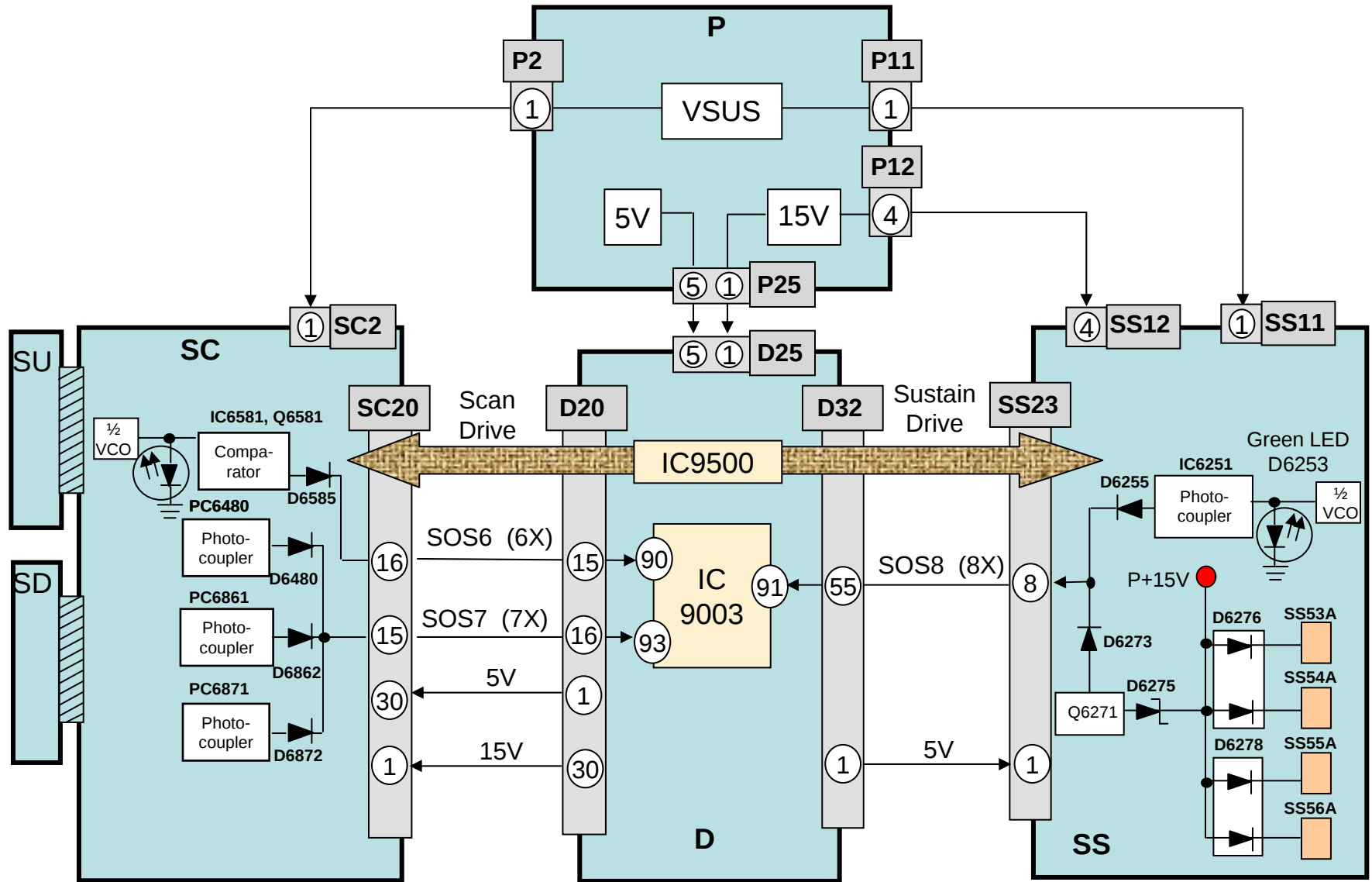
- The DRV RST circuit of the D board is used to monitor the physical connection of the D board to the C board.
- The D board provides the 5V source needed to power the C boards. The 5V is routed back to the D board to activate the “5V SENSE” circuit. If the “5V Detect” line is interrupted before it returns to the D board, the TV shuts down and the power LED blinks 6 times.
- Normally the “5V Detect” voltage from the C boards keeps Q9301 on. When the transistor is on, Q9302 is off allowing for a high to be provided to the CPU (IC9300) and IC9500. If the “5V Detect” line is interrupted, the inline transistor turns off allowing P3.3V to turn on Q9302 and ground the drive reset pins of IC9003 and IC9500. When this happens, the TV shuts down and the power LED blinks 6 times.

How to Bypass Drive Reset (TH-42PR10U)



To bypass this circuit when any of the C boards is disconnected, physically ground the test point TP9010 or the base of transistor Q9302. The transistor Q9302 is labeled differently on the board. The first digit is omitted. This picture shows the location of Q9302 (Q302).

Scan/Sustain SOS Detect Circuits



Scan/Sustain SOS Detect Circuits

6 Blinks SOS: Pin 90 of the MPU IC9003 monitors the status of the SC board. During normal operation, the transistor Q6581 and IC6581 output a low to pin 90. If the SC board becomes defective, a high is provided to pin 90. As a result, the unit shuts down and the power LED blinks 6 times.

6 Blinks SOS: 6 blinks of the power LED may also be obtained from pin 3 of IC9003, the DRV_RESET input. See the DRV_RESET explanation page.

7 Blinks SOS: Pin 93 of the MPU IC9003 monitors the status of the SC, SU, and SD boards. During normal operation, the photo-coupler PC6480 outputs a low to pin 93. If the SC, SU, or SD board becomes defective, a high is provided to pin 93. As a result, the unit shuts down and the power LED blinks 7 times.

8 Blinks SOS: Pin 91 of the MPU IC9003 monitors the status of the SS board. During normal operation, pin 8 of connector SS23 outputs a low to pin 91. If the SS board becomes defective, a high is provided to pin 91. As a result, the unit shuts down and the power LED blinks 8 times.

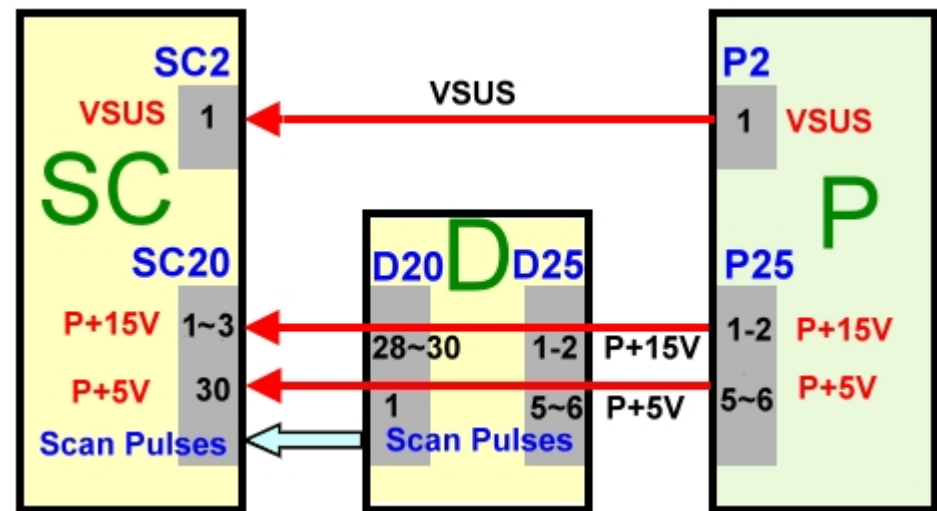
How to Isolate the Scan Drive Section

To isolate the Scan Drive Section (SC, SU, and SD board), remove connectors SC2 (Vsus) and SC20 (P+15V, P+5V, and Scan pulses) from the SC board.

When this is done, the display is completely black (No picture)

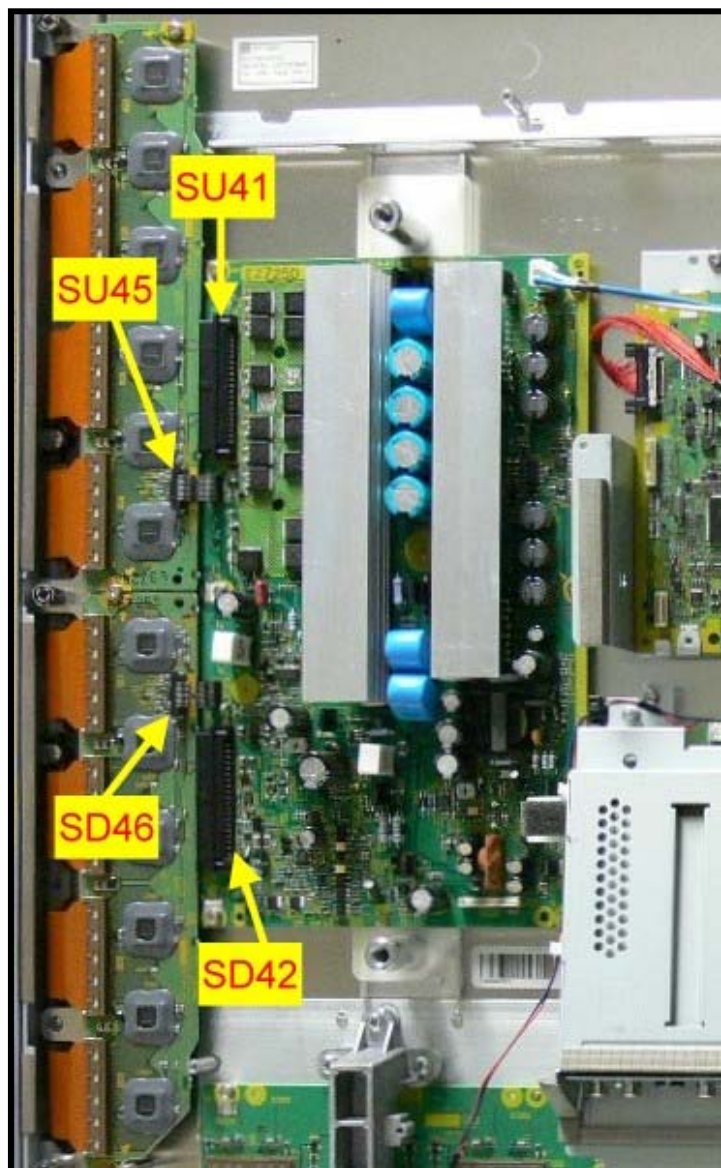


Caution: Do not let the TV run for more than 30 seconds while connectors or boards are disconnected.



This procedure could be useful when troubleshooting 6 or 7 blinks shutdown.

How to Isolate the SU and SD Boards



To isolate the SU board:

1. Connect the connectors SC2 and SC20.
2. Disconnect the connectors SU41 and SU45.
3. Remove the two screws holding the board in place.
4. Slide the board out of the SC board socket.

To isolate the SD board:

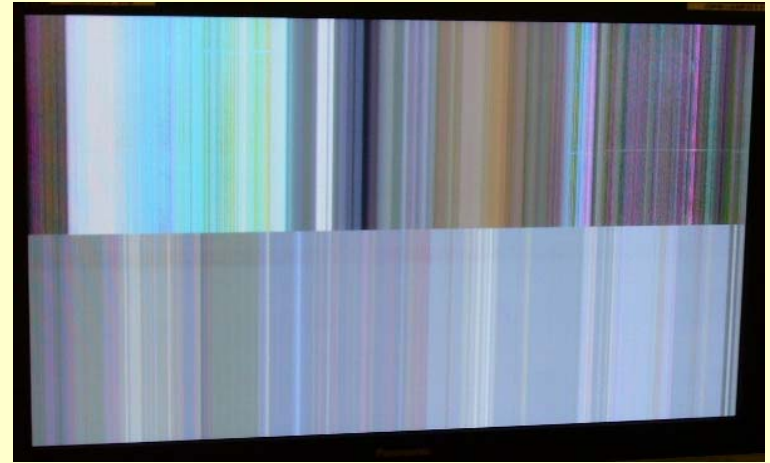
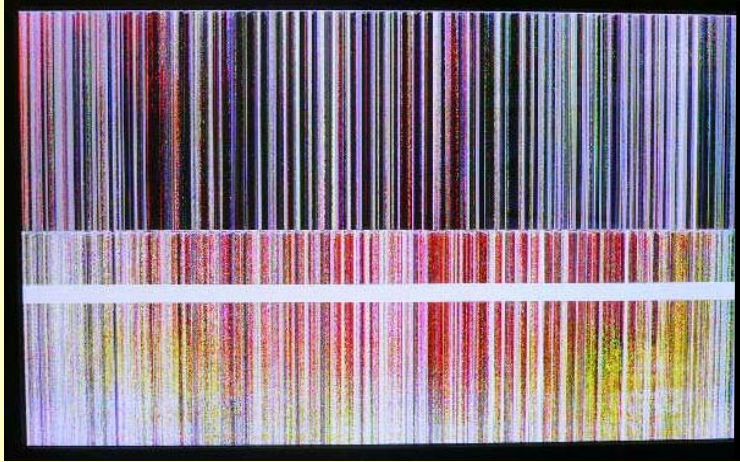
1. Connect the connectors SC2 and SC20.
2. Disconnect the connectors SD42 and SD46.
3. Remove the two screws holding the board in place.
4. Slide the board out of the SC board socket.

Note: When both boards are disconnected, the display is completely black (No picture).

Caution: Do not let the TV run for more than 30 seconds while connectors or boards are disconnected.

This procedure is useful when troubleshooting 6 or 7 blinks shutdown.

Symptoms caused by defective SD boards



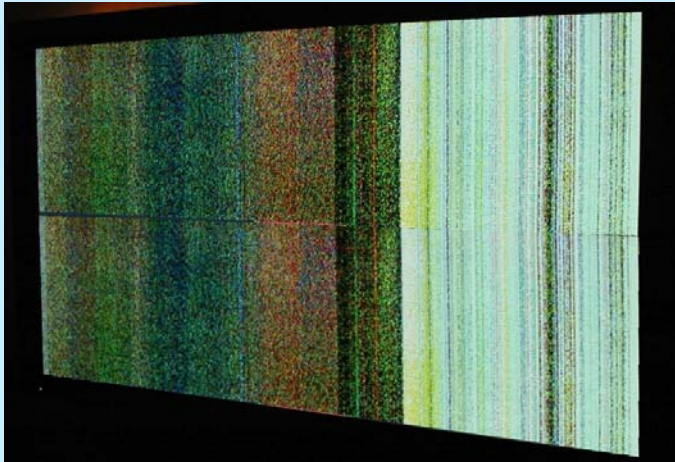
These symptoms seem to be caused by a defective D or SC board, but in reality they are caused by a defective SD board.

To confirm this, disconnect the SD board from the SC board (Follow proper SU/SD board isolation procedure).

If the SD board is defective, the screen will have a good picture at the top half and a completely black area in the lower half.



Symptom Caused By Defective SU Board



Disconnect the SU board from the SC board.
(Follow proper SU/SD board isolation procedure.)
If the SU is defective, the screen will have a
good picture at the bottom half and a completely
black area in the upper half.

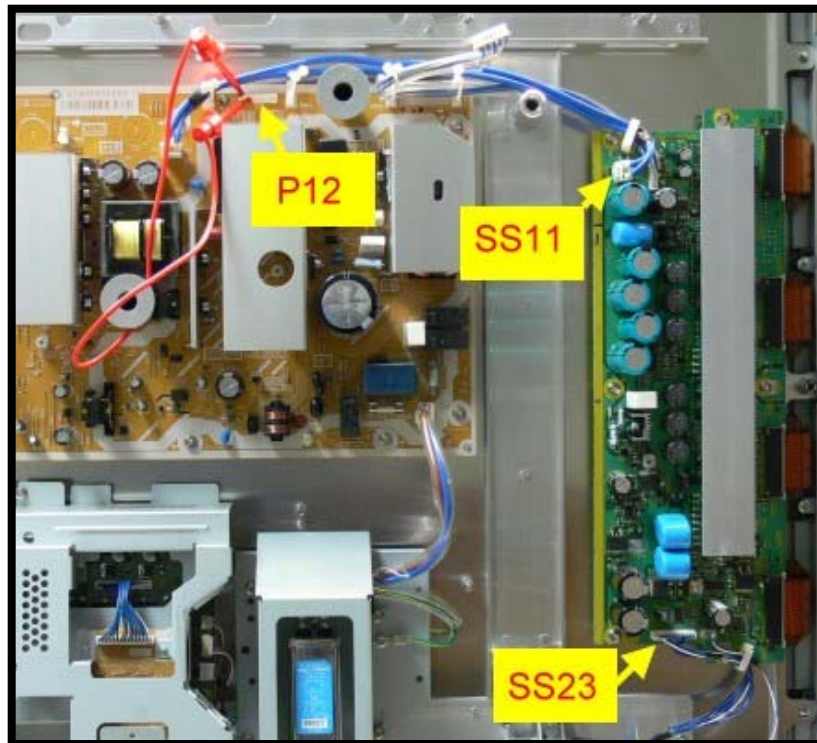
This is what a non-shutdown
problem caused by the SU board
looks like.

How to Isolate the SS board

To determine if the Sustain board is defective, it might be necessary to disconnect it from its power source (P board) and its sustain drive pulses source (D board).

To do this, remove connectors **SS11** (VSUS), **SS23** or **C23** (P+5V and sustain pulses) from the Sustain Drive board (SS).

Remove connector **P12** (P+15V) from the Power Supply (P board). Place a clip lead across pins 8 and 10 of connector **P12** to simulate the power switch.

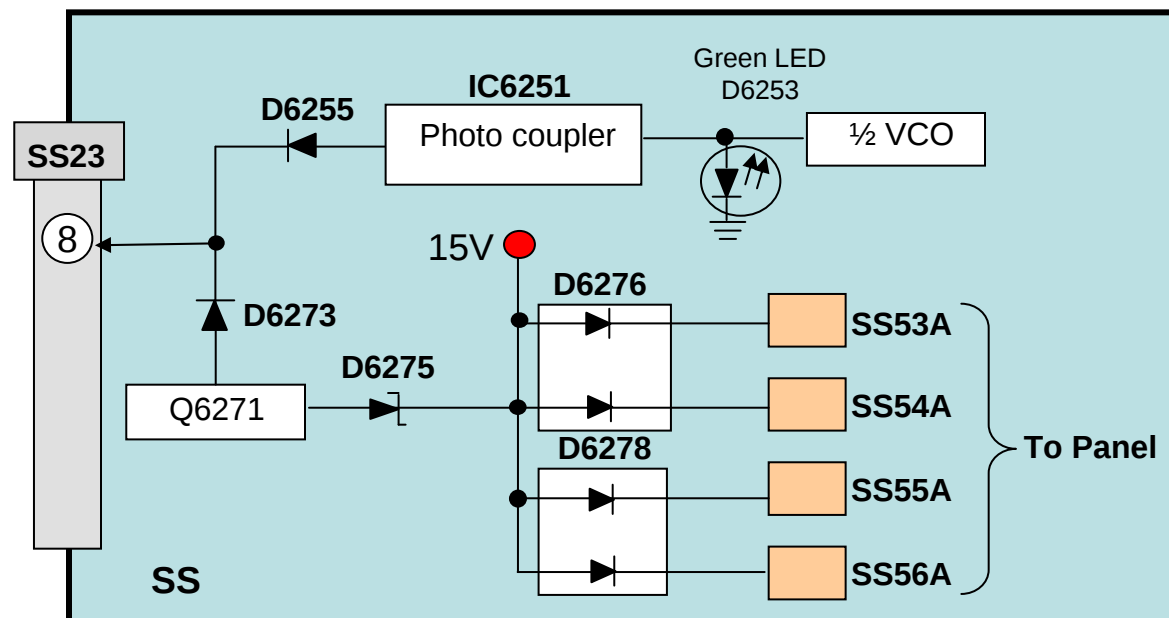


How to Isolate the SS board

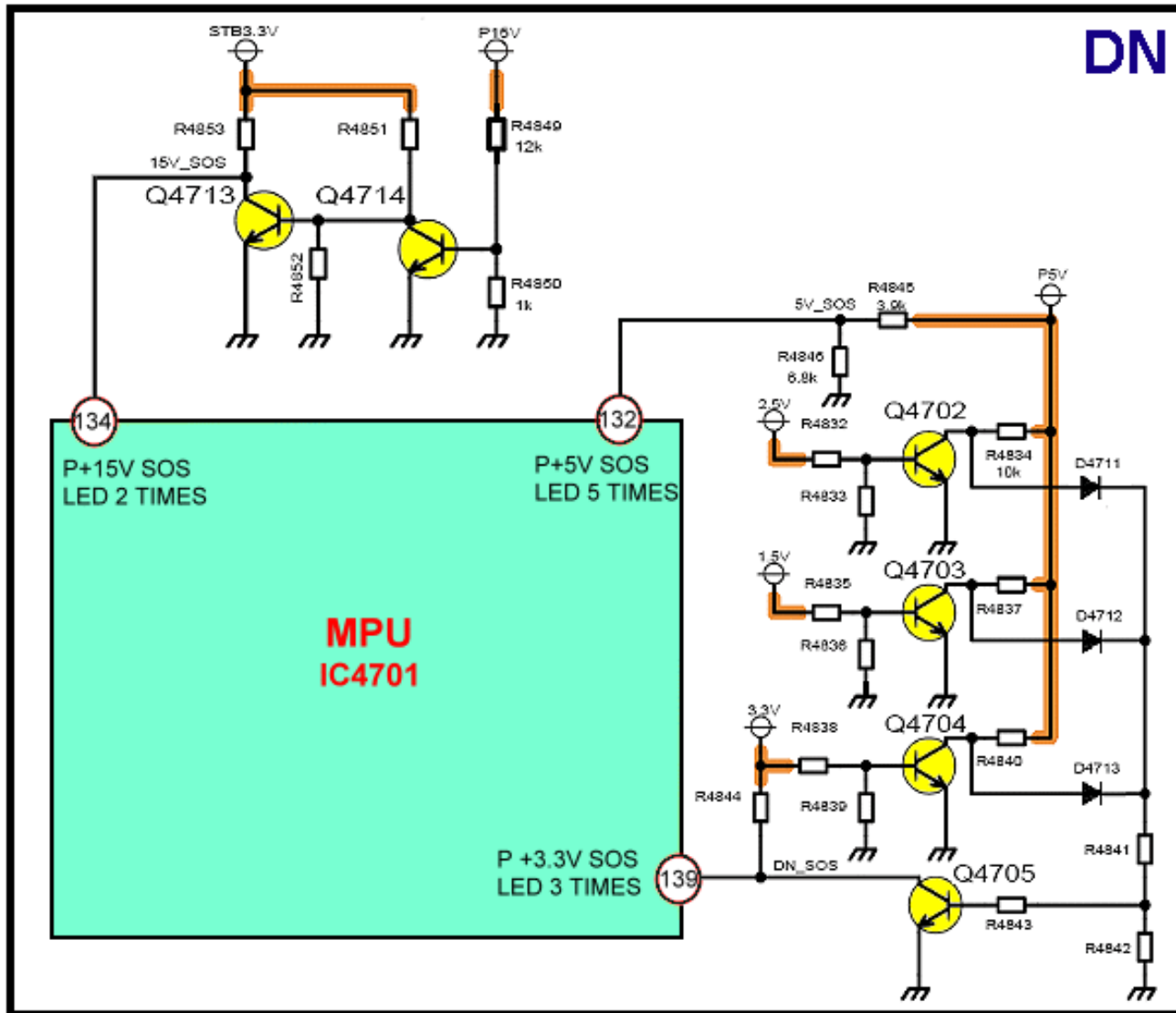
There is an extra SOS Detect circuit in the Sustain board. This circuit is used to monitor for short circuit condition of the sustain electrodes in the panel. Under normal condition, D6275 conducts keeping Q6271 on. When Q6271 is on, a low is provided to the anode of D6273 (D273). If a short circuit is detected, Q6271 turns off and a high is provided to the anode of D6273 (D273). This high is provided to pin 91 of the CPU on the D board. When this happens, the TV shuts down and the power LED blinks 8 times.

To determine if the 8 blinks is caused by the D board, SS board, or the Panel:

- Isolate the SS board and check if the TV stays on when it's turned on.
- If the TV does not stay on after disconnecting the SS board, the D board is defective.
- If the TV stays on, then the SS or the Panel is defective.
- If the anode of D6273 (D273) is high (2.7V) at the time the unit shuts down, the Panel is defective.
- If the anode is low, the SS board is defective.



15V, 3.3V, and 5V SOS Detect Circuit (DN Board)



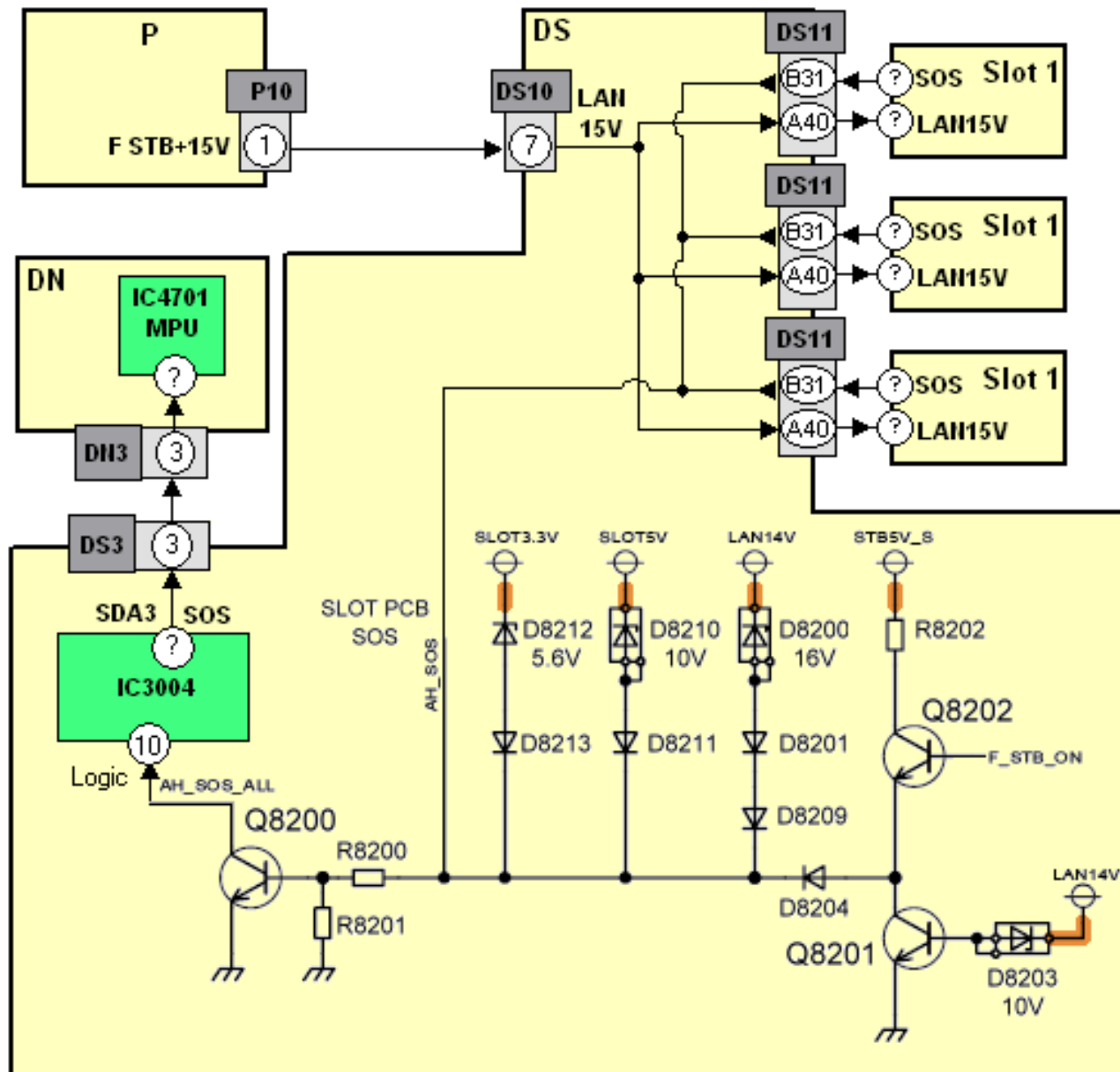
15V, 3.3V, and 5V SOS Detect Circuit (DN Board)

2 Blinks SOS: Pin 134 of the CPU IC4701 monitors the 15V line on the DN board. During normal operation, the transistors Q4713 and Q4714 output a high to pin 134. If the 15V line is missing or shorted, a low is provided to pin 134. As a result, the unit shuts down and the power LED blinks 2 times.

3 Blinks SOS or DN SOS: The 2.5V, 1.5V, and 3.3V sources are developed on the DN board and monitored at pin 139 of the CPU IC4701. During normal operation, the transistors Q4702, Q4703, and Q4704 are on. The transistor Q4705 is off allowing 3.3V to enter pin 139 of the MPU. If any of the voltages mentioned above is missing or shorted, the related transistor turns off and a high is applied to the base of Q4705 to turn it on. This results in a low being applied to pin 139 and the shutdown of the unit. The power LED blinks 3 times.

5 Blinks SOS: On the DN board, pin 132 of the CPU IC4701 monitors the 5V line. During normal operation, the voltage divider R4845 and R4846 applies a voltage drop to pin 132 of the CPU. If the 5V line is missing or shorted, the voltage drop is no longer developed and a low is provided to pin 132. As a result, the unit shuts down and the power LED blinks 5 times.

10 Blinks SOS (SLOT PCB SOS) (DN Board)



10 Blinks SOS (SLOT PCB SOS) (DN Board)

The FSTB +15V output of the power supply is directly provided to the slot boards. When an over-current condition is detected in any of the slot PCBs, a high output is provided to the base of Q8200 of the DS board. The switched output of the transistor is provided to IC3004 for conversion into serial data. The serial data output is then provided to the MPU IC4701 of the DN board to shut down the unit. The power LED blinks 10 times.

SLOT3.3V and SLOT5V

Over-voltage protection is available for the SLOT3.3V and SLOT5V sources. These two voltages are created on the DS board. If their DC level exceeds the reverse breakdown voltage of the inline zener diode, a high is output to the base of Q8200 to execute the shutdown process.

LAN14V Over-voltage Protection

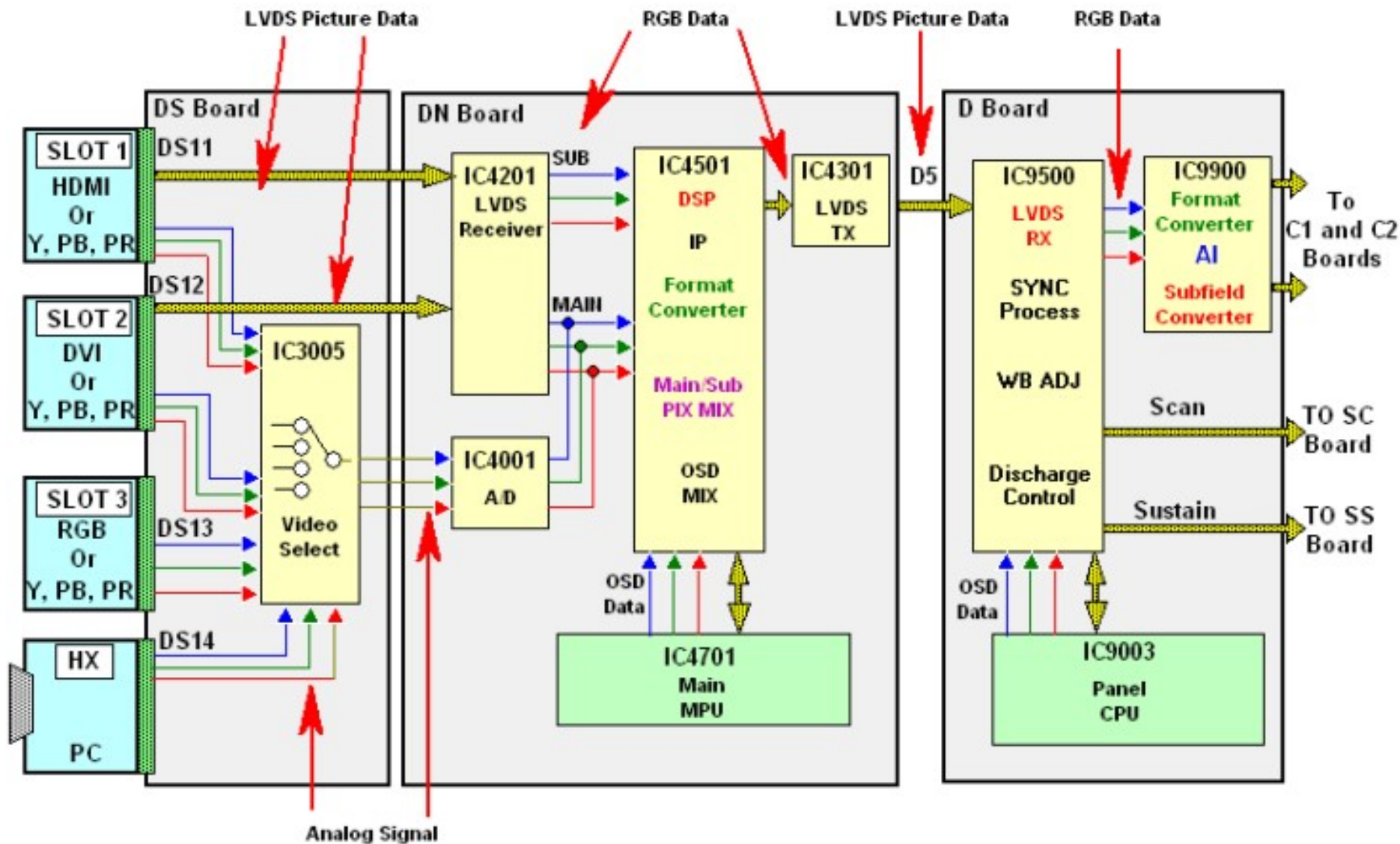
The LAN14V source which originates at the power supply board (P) is also monitored for over-voltage condition. If the LAN14V level exceeds the reverse breakdown voltage of the inline zener diode, a high is output to the base of Q8200 to execute the shutdown process.

LAN14V Low-voltage Protection

The FSTB5V line turns on the transistor Q8202 to provide approximately 5V to the base of Q8202. This would automatically cause a shutdown. The shutdown is prevented by having the transistor Q8201 on. The zener diode D8203 is rated at 10V. When the LAN14V source is normal, the zener diode conducts and turns on Q8201 to shunt the output of Q8202 to ground. If the LAN14V drops to below 10V, Q8201 turns off and the voltage at the collector enters the base of Q8200 to execute the shutdown.

Signal Process

Video Process Block Diagram



Video Process Block Diagram

Slot 1 or Slot 2 may be used for component, NTSC HDMI, DVI or SD inputs. The drawing shows both connections for better understanding of the video selection and process of this unit.

The DS board is an input board that contains 3 slot terminals and a PC input board. The Slot terminals may be used in conjunction with boards that facilitate NTSC, ATSC, RGB, HDMI DVI, and SD video input. Component, RGB or PC Video are input to the DS board and selected by IC3005. The selected input is provided to the DN board for conversion into 10 bit parallel data and input to the Video Processor IC, IC4501. If slot 1 or 2 is used for DVI or HDMI input, the LVDS data from the input board passes through the DS board without alteration and enter the DN board. On the DN board IC4201 (LVDS Receiver) converts the LVDS data into YUV data for application into IC4501, the Video Processor.

IC4501 performs input selection and picture control operations such as brightness, contrast, sharpness, color, tint, etc. It is also responsible for PIP (picture-in-picture) and IP conversion of the video signal. IC4501 also combines the OSD (On-Screen Display) signal from the system control Microprocessor with the main digital video signal. The RGB output signal of the DN board passes through a LVDS (Low Voltage Differential Signaling) transmitter ,IC4301, for conversion into serial data.

IC9500 PLASMA AI (LSI27)

The LVDS receiver inside IC9500 of the D board converts the video signal to 10 bit RGB data, its original format. IC9500 of the D board contains the Discharge Control circuit that analyzes the RGB and sync information of the video signal to create the Scan data to drive the Scan operation (SC) board and Sustain data to drive the Sustain operation (SS) board. The 10 bit data is provided to IC9900.

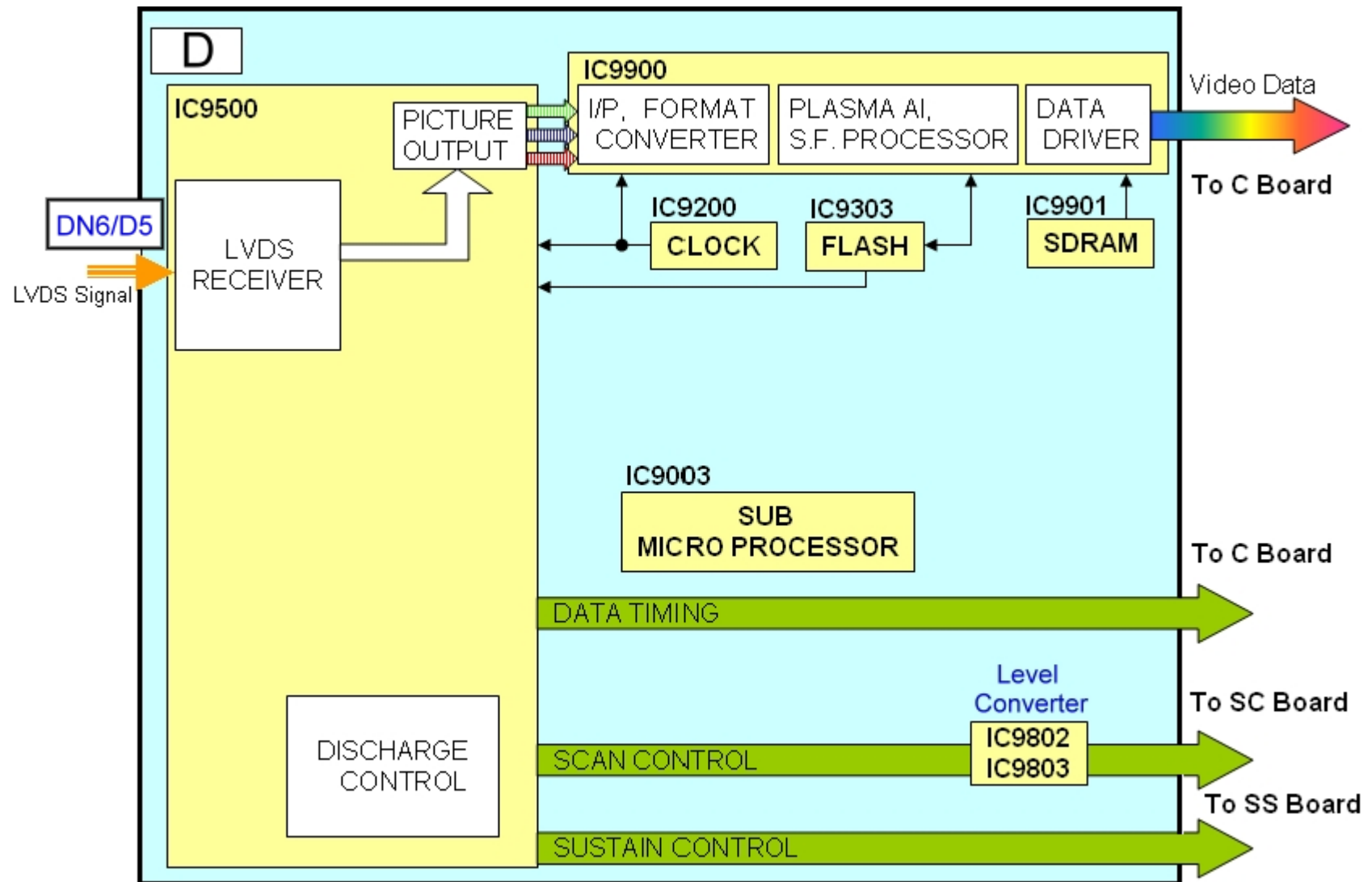
IC9900 Subfield converter

IC9900 is used to drive the left and right half of the panel. It contains a format converter that changes the resolution of the video signal to match the size of the panel. It also contains the Plasma AI (Adaptive brightness Intensifier) circuit that analyzes the APL (Automatic Picture Level) for the distribution of dark and bright components. it subsequently converts the picture data into subfields data before outputting to the C1 and C2 buffer boards to feed the data electrode of the panel.

IC9003 CPU

IC9003 is the CPU that controls the operation of the circuits that drive the panel. It also generates the OSD data (pattern) that is used to troubleshoot the panel's drive circuits.

D Board



D Board

Component	Function	Component	Function
IC9500	LVDS RECEIVER / DISCHARGE CONTROL	IC9802-3	LEVEL CONVERTER (3.3V => 5V)
IC9900	PLASMA AI / SUB-FIELD PROCESSOR	IC9303	FLASH MEMORY
IC9901	DDR SDRAM	IC9003	SUB MICRO PROCESSOR
IC9200	CLOCK GEN.		

Discharge Control

IC9500 of the D board contains the Discharge Control circuit that analyzes the RGB and sync information of the video signal to create the Scan data to drive the Scan operation (SC) board and Sustain data to drive the Sustain operation (SS) board.

The SC board is responsible for the generation of the scan pulses. Scan pulses are used for initialization and selection of the pixels..

The SS board is responsible for the generation of the sustain pulses. Sustain pulses are used to initialize and control the brightness of the panel.

Data Drive

The LVDS receiver inside IC9500 of the D board converts the video signal to 10 bit RGB data, the original format.

The output is provided to IC9900.

IC9900 contains a format converter that changes the resolution of the signal to match the size of the panel. It also contains the Plasma AI (Adaptive brightness Intensifier) circuits that analyzes the APL* for the distribution of dark and bright components. IC9900 subsequently converts the picture data into subfields data to feed the two C boards.

The C boards are buffer boards that are used to distribute data to the shift registers of the panel.

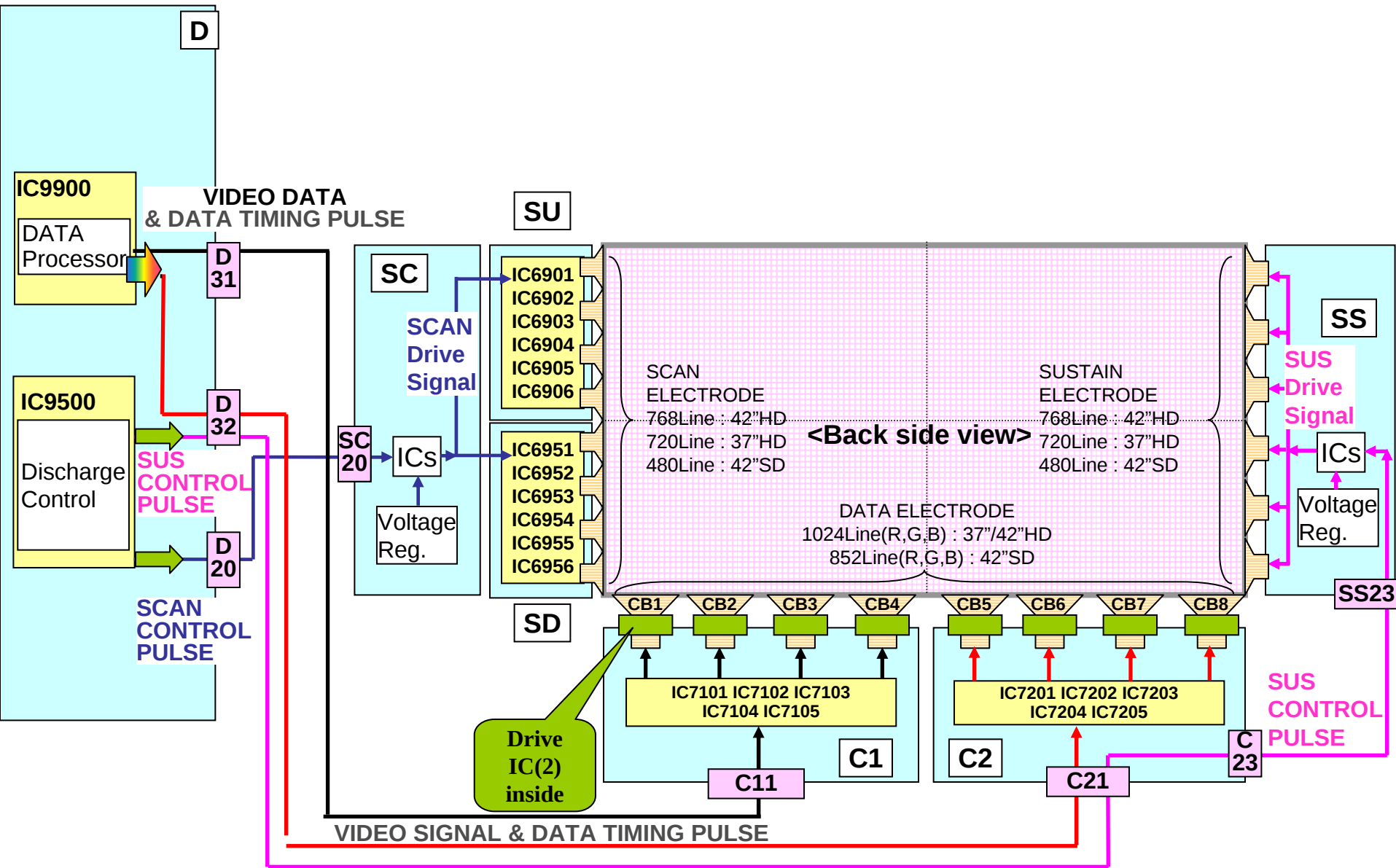
The level converter ICs are level shifters that change the voltage level of the data from 3.3V to 5V.

IC9200 is a clock generator.

IC9303 is a non-volatile memory chip that contains parameters for driving the panel.

IC9901 is a memory chip that is used for sub-field conversion.

Panel Drive Circuits



<SU Board>

<SD Board>

<C Board>

IC6901-IC6906 : SHIFT RESISTOR (UPPER) IC6951-IC6956 : SHIFT RESISTOR (LOWER) IC7XXXX : BUFFER

Panel Drive Circuits

Discharge Control

IC9500 of the D board contains the Discharge Control circuit that analyzes the RGB and sync information of the video signal to create the Scan data to drive the Scan operation (SC) board and Sustain data to drive the Sustain operation (SS) board.

The SC board is responsible for the generation of the scan pulses. Scan pulses are used for initialization and selection of the pixels. The SU and SD boards are de-multiplexer boards that are responsible for converting the serial data output of the SC board into parallel data to drive the panel. Each board drives one half of the panel horizontally.

The SS board is responsible for the generation of the sustain pulses. Sustain pulses are used to initialize and control the brightness of the panel.

Data Drive

IC9900 memorizes the 10 bit data into two field data to drive the left and right side of the panel.

IC9900 subsequently converts the picture data into subfields data to feed the data electrodes of the panel.

The data drive signal of IC9900 is output to the C boards. The C boards are buffer boards that are used to distribute data to the shift registers of the panel.

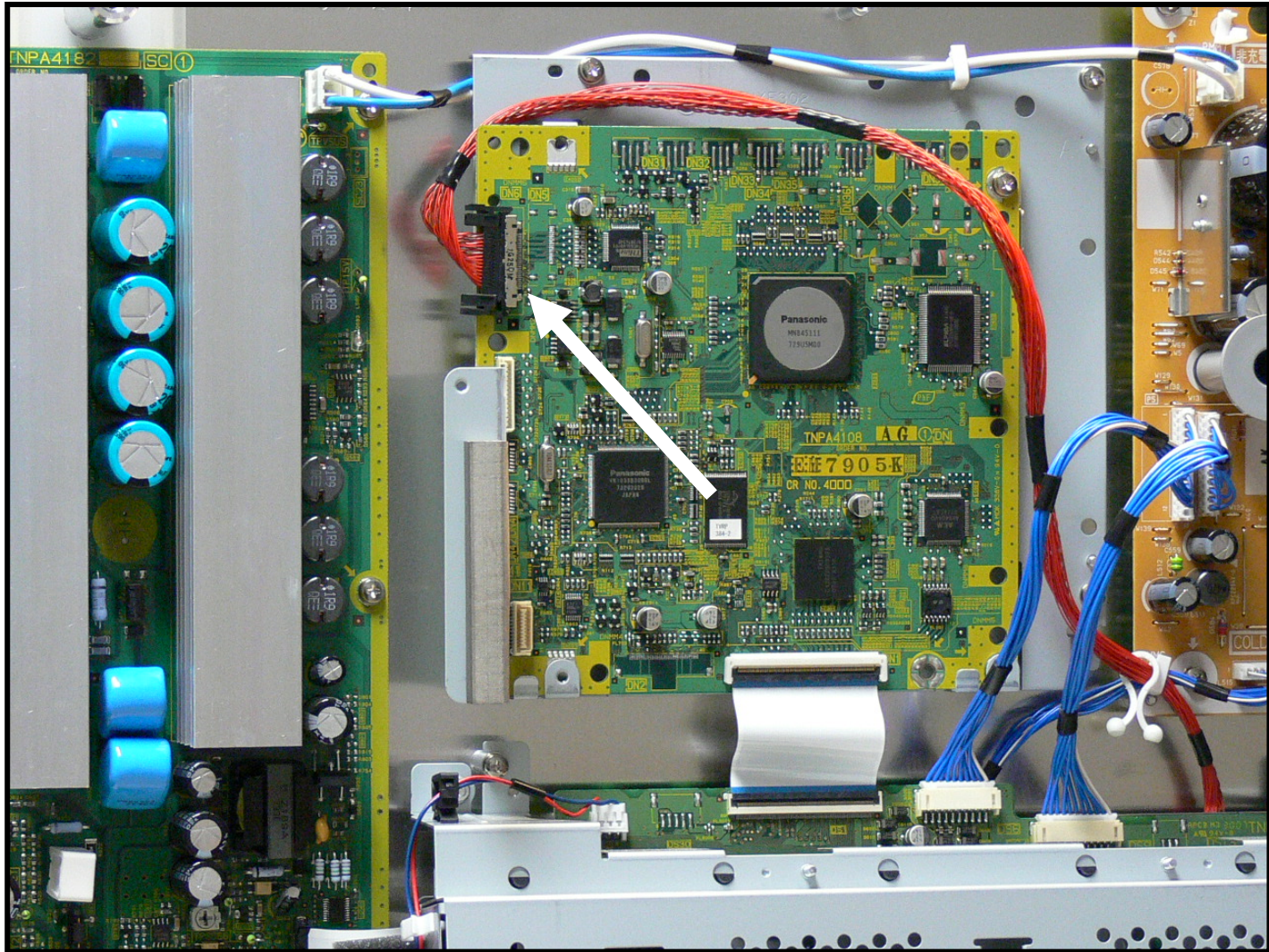
No video, No OSD

Determining whether a No video, No OSD symptom is caused by the video process or the panel drive circuit

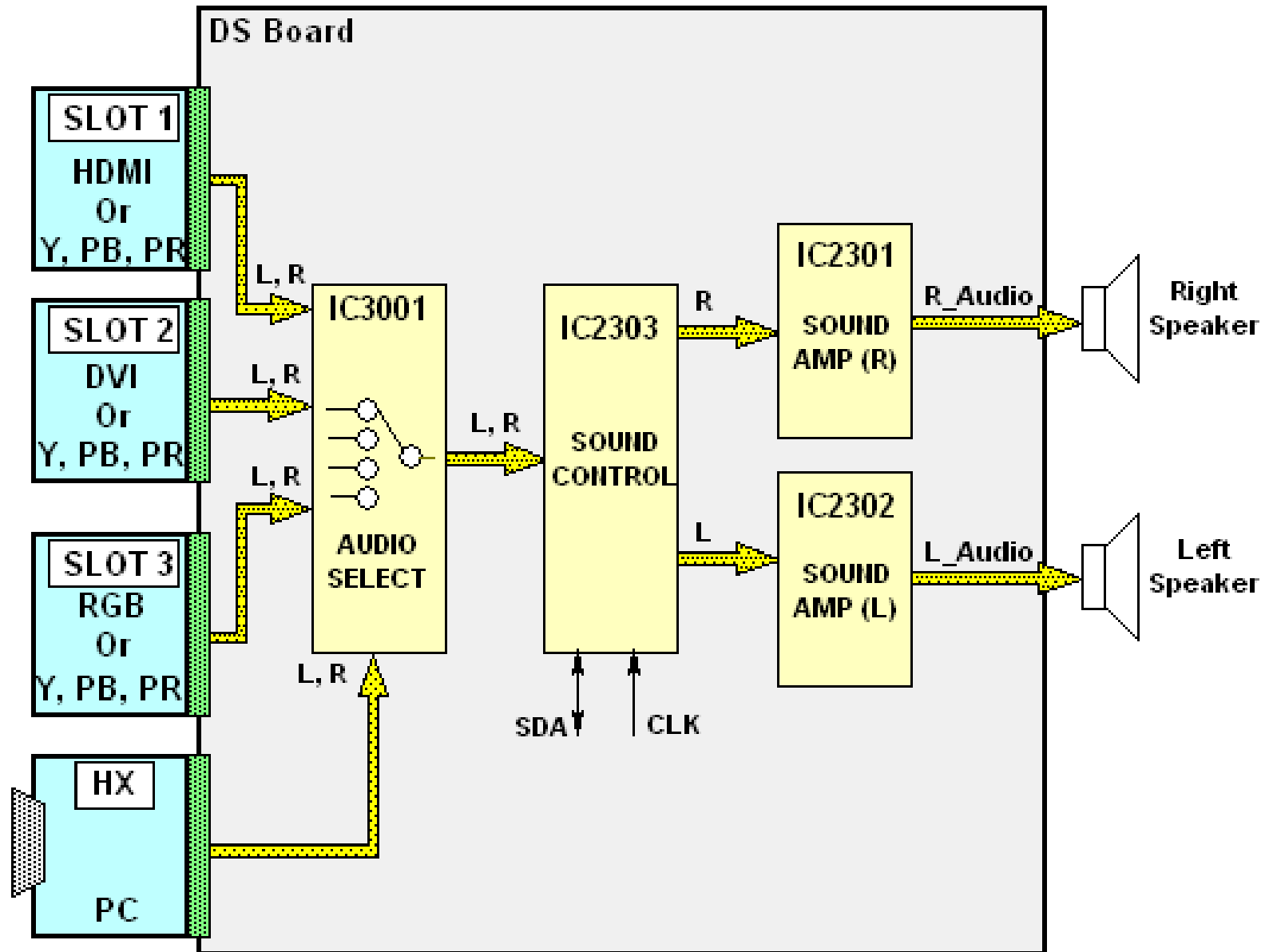
1. Unplug the unit from the wall outlet.
2. Disconnect the **connector DN6/D5** from the DG board.
3. Plug the unit into the wall outlet and turn on the power.
4. If the unit displays a white screen, It is a video process problem.
5. If the unit does not display a white screen, Proceed to check the panel drive circuits.



Physical Location of Connector DN6



Audio Process



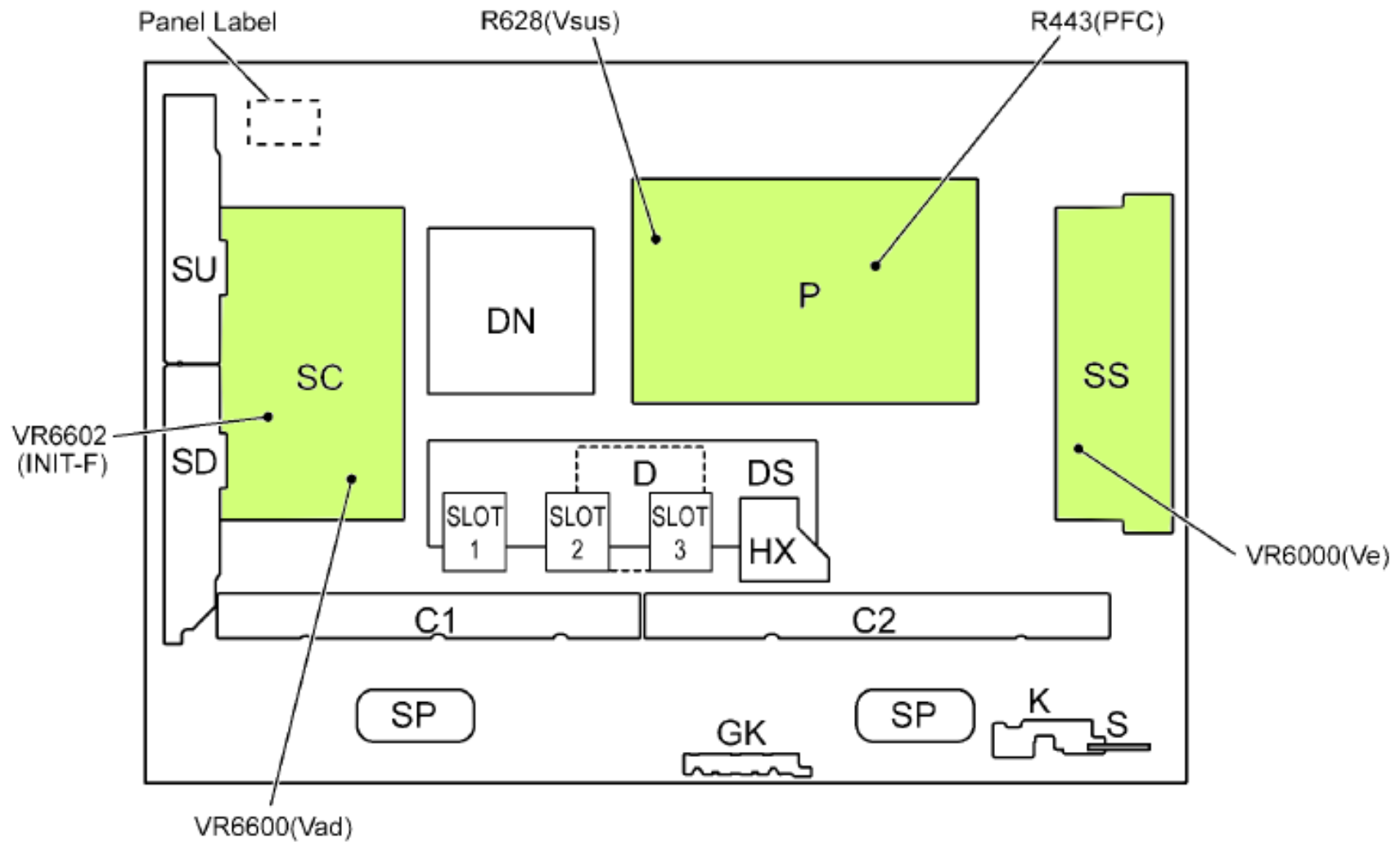
Audio Process

IC3001 of the DS board handles the audio selection of all inputs. Analog Audio signals from composite, component, DVI inputs, etc are connected to IC3001 for selection. The output of the switch enters the Audio Process IC, IC2303. Volume, bass, treble, and balance adjustments of the audio signal are performed by this circuit. The two channel analog output is applied to IC2301 and 2302 for amplification. The output signals of the power amplifiers are output to the right and left channel speakers for sound reproduction.

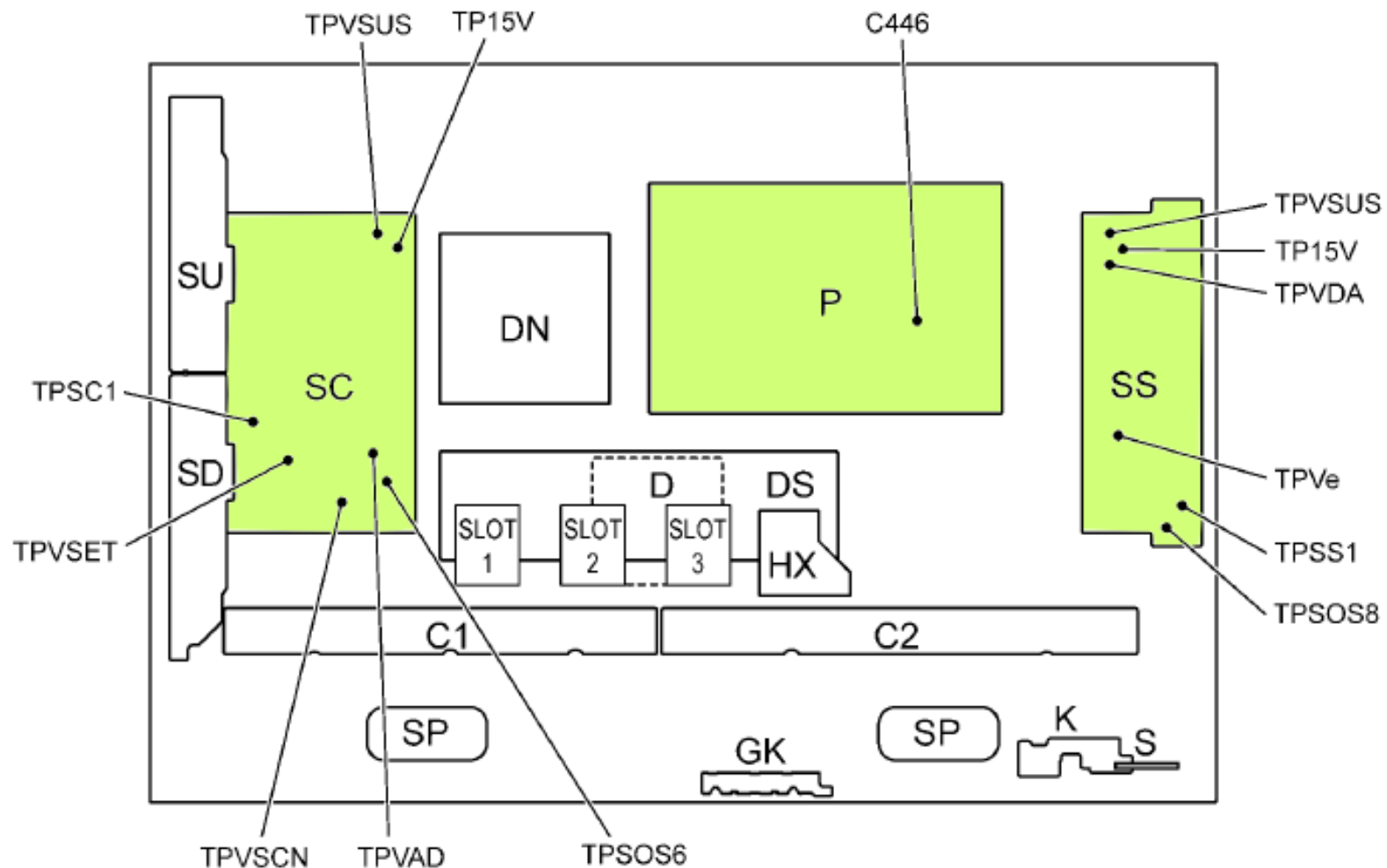
Adjustments

Adjustments

Adjustment Volume Location



Adjustment Test Point Location



Adjustment Procedure

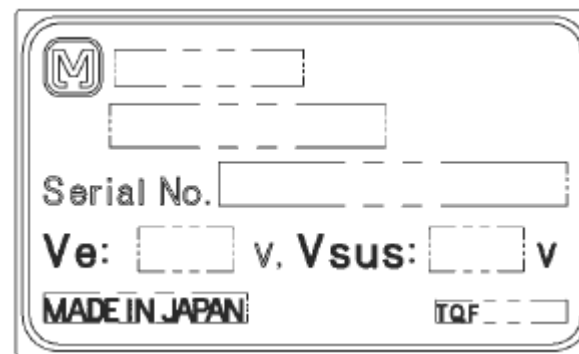
Item / Preparation:

1. Access the IIC mode and set the Aging Pattern to 0 (Vset adjustment pattern).
2. Set the picture adjustment controls as follows:
 - Picture menu : Standard
 - Picture : 25
 - Aspect : Full

Caution:

1. First perform Vsus voltage adjustment.
2. Confirmation of Vscn voltage should be performed after the adjustment of Vad voltage

When Vad = 105V, Vscn Voltage is 40V $\pm$ 4V.



Adjustment Voltage

Adjustments

Perform the Driver Setup Adjustments.
Check or adjust the voltages with a voltmeter.

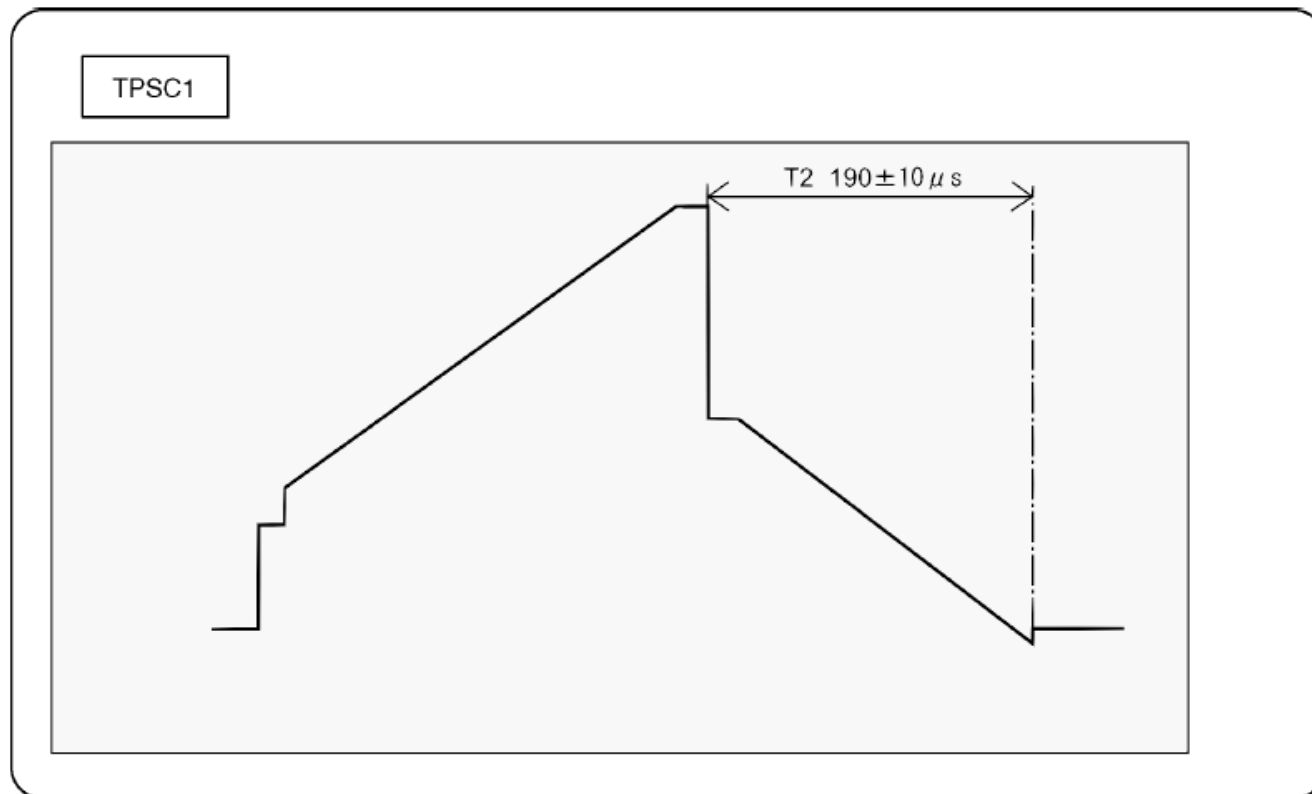
Note: Refer to the panel label for voltages that are not listed in the table.

Name	Test Point	Voltage	Volume	Remarks
Vsus	TPVSUS (SS)	Vsus $\pm$ 2V	R628 (P)	*
Ve	TPVE (SS)	Ve $\pm$ 1V	VR6000 (SS)	*
Vset	TPVSET (SC)	330V $\pm$ 7V	Fixed	
Vad	TPVAD (SC)	-105V $\pm$ 1V	VR6600 (SC)	
Vscn	TPVSCN (SC)	Vad+145V $\pm$ 4V	Fixed	
Vda	TPVDA (SS)	75V + 1V, -2V	Fixed	
PFC	C446 (+)(-)	396V $\pm$ 0.5V	R443 (P)	

Initialization Pulse Adjustment

1. Input a white signal to plasma video input.
2. Set the picture controls as follows.
 - Picture menu : Vivid
 - Normal : Set
 - Aspect : Full
3. Connect the oscilloscope to TPSC1 (T2) and adjust VR6602 for $190 \pm 10 \mu\text{Sec}$.

{	TH-37PR10U
	TH-42PR10U



Self-check

❖ Self-check checks the communication IIC bus lines and provides a SOS History

1. To get into the Self-check mode, press the “**VOLUME DOWN**” button located on the side of the set.
2. At the same time press the “**OFF-TIMER**” button on the remote control. An OSD resembling the picture on the right shows up on the screen. If a CCU port is checked and found to be incorrect or not located, then “--” (two dashes) appear in place of “OK”.
3. “01” in the “PTCT” line represents the number of blinks emitted by the Power LED after a shutdown (SOS).
4. “H09” in the “PTCT” line is the error code.

Note: The “PTCT” line is present in the first “Self-check Screen” activation only.

Self-Check Screen

ID	IIC1	IIC2	IIC3	IIC4
DN	IC4703 OK H90		DS	IC8181 OK H51
	IC4001 OK H61			IC3001 OK H22
	IC4201 OK H56			IC3003 OK H63
	IC4501 OK H53			IC3004 OK H64
	IC4721 OK H62			IC3005 OK H65
				IC2303 OK H21
D	PANEL	OK		
	PTCT	01 H09		

❖ To reset the unit:

1. Press and hold down the volume down button on the side of the set and at the same time, press and hold down the “R” button on the remote control. Keep pressing the buttons until a field labeled “Shipping” appears on the screen.
2. Do nothing further, and wait until the field goes away.
3. Turn off the main power switch to complete the reset procedure.

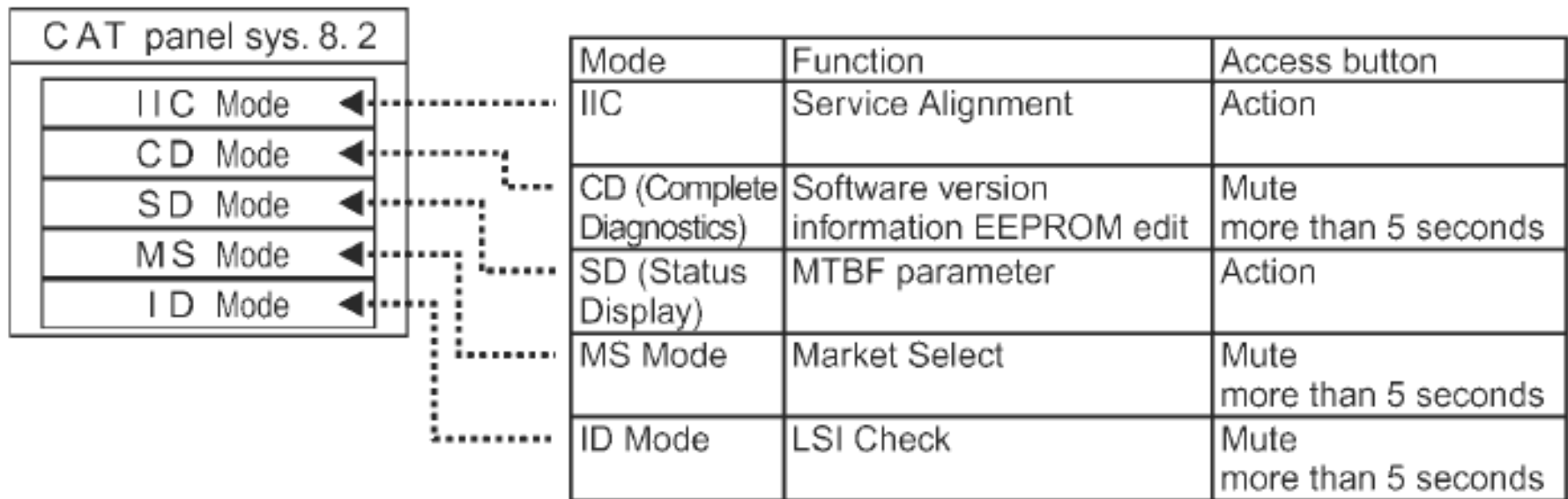
How to Reset the Unit

To reset the unit:

- ❖ Press and hold down the volume down button on the side of the set and at the same time, press and hold down the “R” button on the remote control. Keep pressing the buttons until a field labeled “Shipping” appears on the screen.
- ❖ Do nothing further, and wait until the field goes away.
- ❖ Turn off the main power switch to complete the reset procedure.

How to Enter the CAT (Computer Aided Test) Mode

To enter the Serviceman Mode, turn the TV on and while pressing the “VOLUME (-)” button on the main unit, press the “Status” button of the remote control three times within 2 seconds. The unit displays the CAT Mode menu.



To exit the Serviceman Mode, To exit the **CAT mode**, access the “**ID mode**” and switch off the main power.

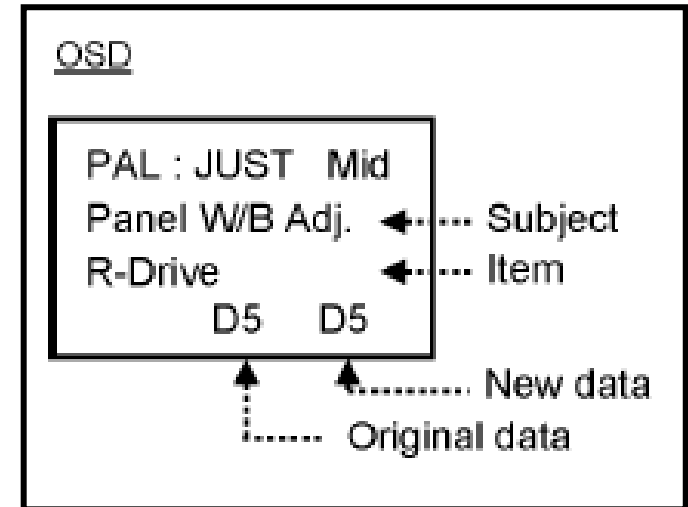
How to Enter the IIC Mode of the CAT Menu

Select the IIC mode by pressing the **Up/Down button** on the remote control from the front page of the CAT menu, and then press the **Action button** on the remote control.

How to use the IIC mode?

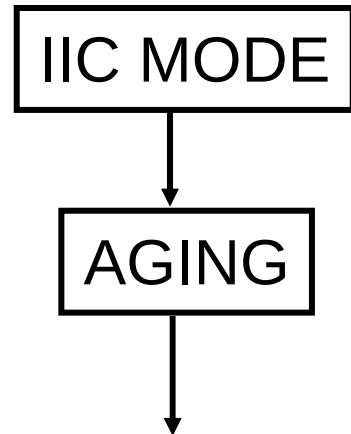
1. Select the alignment subject by pressing the **UP/Down buttons** on the remote control.
2. Select the alignment item by pressing the **Left and Right buttons** on the remote control.
3. Adjust the optimum setting by pressing the **Volume Up/Down buttons** on the remote control.
4. The data is memorized when the **R button** is pressed on the remote control or the alignment Subject (or item) is changed.

To exit the IIC mode, press the **R button** on the remote control.



How to Access the pattern generator

To access the internal pattern generator, select **AGING** from the main adjustment item of the IIC mode menu and press the **ACTION** button of the remote control. Press the **ACTION** button to navigate through the different patterns.



RGB WHITE	4 BLUE	9 RAMP_B	E WHITE BAR SCROLL
0 Vset ADJUSTMENT PATTERN	6 RAMP_W	A 1% WINDOW	F 2 DOT OUT LINE
1 WHITE	7 RAMP_R	B COLOR BAR	10 BRIGHTNESS MEASUREMENT PATTERN
2 RED	8 RAMP_G	C A/B ZONE	
3 GREEN			

To **Exit** the internal pattern generator, press the [R] button of the remote control

How to Enter the CD Mode

Select the **CD mode** of the CAT menu by using the **Up/Down button** on the remote control, then press the **Mute button** on the remote control for more than 3 seconds.

CD		
MONITOR-MCU	1. 0200H10	OK
MONITOR-EEPROM DN	41. 00 1	76 DA
MONITOR-EEPROM H	— —	— —
MONITOR-FPGA	200	
MONITOR-EEPROM Change Addr	00	01
Data	01	01
PANEL-MCU	2. 02	
PANEL-EEPROM	44. 00	
PANEL-FPGA	41. 04	
PANEL-PDROM	41. 05	
PTCT	00. 00. 00. 00. 00.	

----- Factory use

----- New data

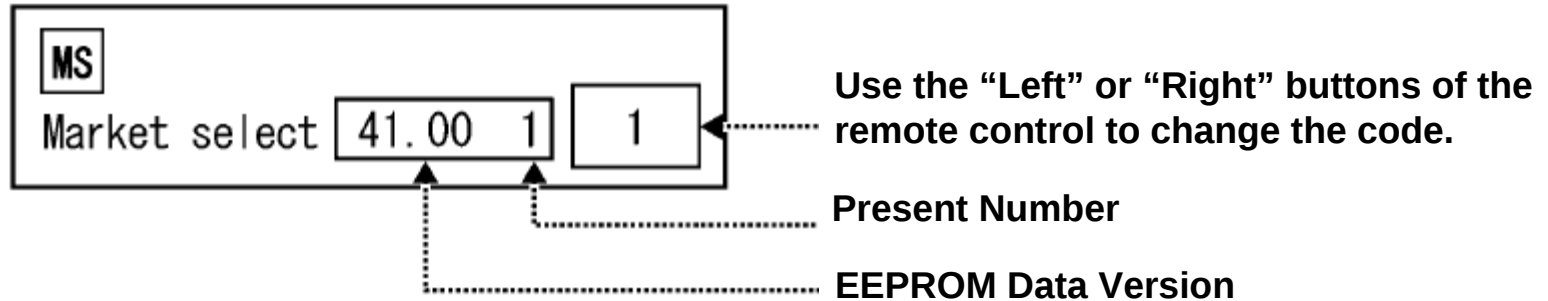
----- SOS history

----- Original data

To **Exit** the internal pattern generator, press the **[R]** button of the remote control

How to Enter the MS Mode

Select the **MS mode** of the CAT menu by using the **Up/Down button** on the remote control, then press the **Mute button** on the remote control for more than 3 seconds.



To exit the MS mode, press the **R button** on the remote control.

Caution: Market Select should be set after exchanging the DN Board.

North America's Market Code is “1”.

North America's Hotel Model Market Code is “9”.

IMP-1200 ATSC Digital Tuner Card with Pro:Idiom



The Panasonic IMP-1200 is an integrated HD Hospitality Tuner Plug-in Board that offers Pro:Idiom decryption of HD premium content and Dolby Digital 5.1 Audio Outputs. It occupies slots 2 and 3 of our 9 and 10-Series Hospitality and Pro Plasmas.¹

IMP-1200 Specifications

Signals

- NTSC / QAM (64/256) / 8VSB (ATSC)

Codecs

- MPEG1, MPEG2

Inputs

- RF F-Connector (Coax)
- Composite Video RCA
- L/R Audio Input 1/8" minijack connector
- IR Input 1/8" minijack connector
- Serial Input2 1/8" minijack connector
- (RS232 Protocol for control systems)
- Control RJ11 connector for PPV control
- (MATE protocol)

Outputs

- L/R Audio Output 1/8" minijack connector (Line level out)
- Digital Audio Output 5.1 digital audio output - RCA

Features

- Tri-band tuning Includes tuner capable of three bands of tuning in North American market
- Pro:Idiom Support Includes 128-bit decryption for the HD PPV systems (LodgeNet / OnCommand)
- Serial Control2 Includes support for Crestron, Extron,
- Control4 and Vantage systems through a common serial control protocol. This controls both the display and the tuner with one set of serial commands.
- IR Input Direct IR input for third-party control system that requires IR control. (Note: LodgeNet installations should use an IR system because the LodgeNet terminal does not support the serial control protocol.)

IMP-1200 Compatibility

NOTE: For LodgeNet LaunchPad or RoomDock compatibility, an HDMI card must occupy slot 1.

(TYFB10HMD Dual HDMI Board is standard on all Panasonic PF10UK and PH10UKA Pro Plasmas.)

1. Same as our FB9TU Tuner Board, the IMP-1200 is not compatible with our 2-slot plasmas (TH-37PH9UK and TH-37PH10UK).
2. Serial Input is only supported with our IMP-1200S step-up model.

Compatible Displays

The IMP-1200 card is compatible with the following Panasonic Professional Displays:

TH-37PG9U, TH-37PR9U, TH-42PG9U, TH-42PR9U, TH-42PS9UK, TH-42PH9UK, TH-50PH9UK, TH-50PF9UK, TH-65PF9UK, TH-103PF9UK, TH-42PR10U, TH-37PR10U, TH-42PH10UK, TH-50PH10UK, TH-50PF10UK, TH-58PH10UK, TH-65PF10UK, TH-103PF10UK

Note: The IMP-1200 is not compatible with models that only include two card slots, such as the TH-37PH10UK

Enseo HD 1000 HDMI Switch Box Dolby Digital Tuner



The Enseo HD1000 is a tri-band high-definition tuner designed to meet the specific requirements for hospitality systems and includes Pro:Idiom decryption of HD Pay-Per-View movies. The HD1000 is designed as a bridge between multiple display devices and multiple Pay-Per-View providers through a single hardware and software design. The Enseo design provides flexibility to both the display manufacturer and the PPV providers through a consistent, compatible tuner for hospitality.

Key Features

- NTSC / 8VSB / QAM tuner
- HDMI Output
- Dolby Digital 5.1 Surround output
- Compatibility with major PPV providers
- Firmware updates and Cloning through RF Server
- Optional available IP Streaming

Enseo HD 1000 Specifications

- Digital Tuner: QAM / 8VSB
- Analog Tuner: NTSC
- Decryption: Pro:Idiom
- Resolutions: 480i, 480p, 720p, 1080i, 1080p

PROCESSING

- MPEG-2 4:2:0 MP/ML video decoding
- MPEG-2 4:2:0 MP/HL video decoding
- AC3 Audio
- PCM Audio
- MPEG2 Layer 1 and Layer 2 Audio
- Optional
 - MPEG-4 video / AAC audio
 - Window Media 9

INPUTS

- RF Input
- Control: 2 x RJ12 (SmartPort / MTI)
- Optional Inputs
- Composite Video / S-Video
- Audio (L/R Stereo)
- USB2.0
- IR Input
- Ethernet (10/100/1000)

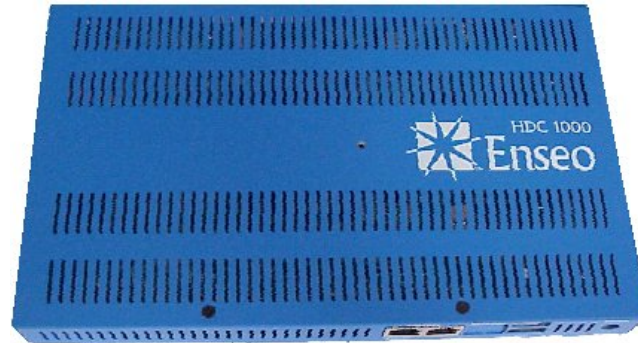
OUTPUTS

- HDMI (HDCP)
- Digital Audio (S/PDIF)
- Analog Audio L/R Audio (RCA)
- Optional - Component / RGB analog video

PHYSICAL ELEMENTS

- Regulatory: FCC Class B
- Dimensions (LWH): 11.5" x 6.26" x 1.1"
- Power Consumption: 12.5 Watts
- Environmental: RoHS compliant

HDC1000 Hospitality Clone Device (1)



Using one fully installed display with Enseo-built tuner, set up the channel and display features as desired to represent the “Golden Master” that will be cloned. The following settings are available as being able to be cloned:

Enseo HD1000 Settings:

Channel Options

- Channel Lineup (include/exclude)
- Digital Channel mapping to analog channel
- AV input mapping to Channel
- Graphic logo for channel
- Channel text label
- Channel Usage (Audio & Video, Audio only, Video only)

Switch-On Options

- Default Channel
- Default Volume
- Picture Format

On-Screen Display Options

- Show Volume Indicator
- Use 3-Digital Entry
- Show Channel Guide
- Channel Banner Contents
- Welcome Message

HDC1000 Hospitality Clone Device (2)

Control Options

- ESP
- Source Menu Item
- Picture Format Menu Item
- Minimum Volume
- Maximum Volume
- Setup Key Sequence (password setting for configuration menus)

Captioning Setup Options

- Restore Previous Setting
- Captioning (On/On When Muted/Off)
- Digital Captioning Mode
- Analog Captioning Mode

V-Chip Options

- Restore Previous Setting
- V-Chip Menu Item for user menu
- Default Limits

Service Options

- Update Channel
- Allow Update Searching